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The Development of Job-Based Psychological Ownership

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The Development of Job–Based Psychological Ownership

Robert Bullock

A dissertation submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

In

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Seattle Pacific University

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Dedication

I dedicate this dissertation to:

Joseph “Bubba” Alexander Green

nephew, best man, friend

You were a shining light in the lives of more people than you ever knew, whose lives will be darker that you’re gone, yet are still better for knowing you.

and

Amanda Mae Bomar

wife, teammate, love

I could not have done this without your support, patience, and sacrifice. You are simply the most awesome pterodactyl I know, and I am lucky to be yours.

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Robert Bullock

437 words

Abstract

Psychological ownership has come to light as an important state with strong implications on employee attitudes and behaviors. However, relatively little attention has been paid towards the process by which employees come to develop feelings of psychological ownership towards their work, particularly regarding the role played by individual traits in this process. Ownership theorists claim that personality and disposition should matter (Mayhew, Ashkanasy, Bramble, & Gardner, 2007; Pierce & Jussila, 2011), yet these claims remain largely untested.

The purpose of the current investigation is to address these gaps by exploring how employee disposition and job design contribute to the development of job-based psychological ownership. Employing a cross-sectional approach, data were collected using an online survey where participants were asked to complete measures of trait positive affectivity (PA), job characteristics, work experiences, and job-based psychological ownership. Because the study focused on job-related phenomenon, participants were required to work full-time in a location other than their home to be considered for this study. The final 426 participants (60.4% male, 39.6% female) had an average tenure of 5.04 years ($SD = 5.03$) and represented a wide range of industries and job levels (23.7% entry-level, 31.0% individual contributor, 17.8% supervisory, 10.8% mid-level manager, 2.8% senior manager, 13.8% technical or professional). Hypotheses were tested using bootstrapped regression analyses and structural equation modeling.

Results indicated that job autonomy has a positive effect on job-based psychological ownership ($B = 0.501$, CI 0.415 to 0.594) through three mediated paths: investment of ideas,

effort, and self into one's work ($B = 0.252$, CI 0.178 to 0.349), experienced control and influence over one's work ($B = 0.214$, CI 0.137 to 0.293), and intimate knowledge and understanding of one's job ($B = 0.036$, CI 0.003 to 0.082). Employee PA significantly moderated the mediated path from autonomy to ownership through experienced control ($Index\ of\ ModMed = 0.017$, CI 0.000 to 0.045), such that control mattered more for high-PA employees. Exploratory analyses suggest that PA may play a dual role – as a moderator of autonomy's effects on control ($B = 0.052$, CI 0.009 to 0.100), and as an indirect effect on ownership itself. For example, high-PA employees reported greater investment of self in their work, which in turn predicted job-based psychological ownership ($B = 0.255$, CI 0.177 to 0.361).

Ultimately, job autonomy stood out as having a particularly strong and consistent positive effect on job-based psychological ownership. Results suggest that *all* employees, from the most enthusiastic to the most apathetic can experience this positive psychological state. That is, as long as they are afforded a high level of autonomy in deciding how to plan and carry out their work.

Keywords. psychological ownership, job-based psychological ownership, job autonomy, positive affectivity, experienced control, investment of self, intimate knowing

CHAPTER I

Introduction and Literature Review

“Nobody ever washes a rental car”

–Scott J. Simmerman, Ph.D.

Introduction

The notion of ownership is one of the oldest and most enduring human concepts. In the simplest sense of this word, to own something is possess it. Traditionally, the “it” that is possessed is something physical in nature, such as property, objects, or currency. However, when considering ownership in the context of work, a different meaning arises. This other form of ownership, termed psychological ownership, plays an important yet under-studied role in the complex interaction of people and processes (Liu, Wang, Hui, & Lee, 2012).

Pierce, Kostova, and Dirks (2003) describe psychological ownership as a cognitive affective state where “individuals feel as though the target of ownership or a piece of that target is theirs” (p. 86). It reflects a deep relationship between a person and a target, such that the owner comes to experience the target as a part of their extended self (Belk, 1988). In organizational settings, employees that develop psychological ownership towards their jobs come to experience ownership towards their organization (Peng & Pierce, 2015) and come to see their organization’s success as their *own* success (Dittmar, 1992; Pierce & Rodgers, 2004).

As an applied theory, psychological ownership has been around for less than 15 years. In this time, it has warranted significant attention due to its relationship with a number of relevant and impactful outcomes. These are largely positive, such as job satisfaction, accountability, organization-based self-esteem, intent to stay, organizational citizenship behavior, financial

performance, sales performance, and more (Brown, Pierce, & Crossley, 2014; Mayhew, Ashkanasy, Bramble, & Gardner, 2007; Brown, Pierce, & Crossley, 2011; Pierce & Rodgers, 2004; Van Dyne & Pierce, 2004; VandeWalle, Van Dyne, & Kostova, 1995; Wagner, Parker, & Christiansen, 2003). Psychological ownership can also promote negative outcomes such as territoriality and knowledge withholding (Avey, Avolio, Crossley, & Luthans, 2009; Peng & Pierce, 2015).

As a whole, psychological ownership is considered a positive phenomenon. In fact, Avey et al. (2009) compelled researchers to incorporate psychological ownership into the emerging field of positive organizational behavior (POB). This due to its similarities with other POB constructs such as psychological capital and psychological well-being, and because it meets POB inclusion criteria of having sound theory and measurement, being open to development in people, and having strong links to organizational performance (Luthans, 2002). As such, there is great practical value in identifying the job-related factors and individual characteristics that promote ownership feelings.

Psychological ownership is also very intriguing from a theoretical perspective. Pierce, Jussila, and Cummings (2009) claim that psychological ownership serves a central mediating function for explaining how job and organizational features influence employee attitudes and behaviors. In fact, several studies have found evidence that psychological ownership acts as a critical psychological state through which the structure and experience of work produces individual-level effects on motivation, performance, and job attitudes (O'Driscoll, Pierce, & Coghlan, 2006; Mayhew et al., 2007; Brown et al., 2014).

Given the host of positive outcomes and its strong potential as a mediating state, practitioners and scholars would benefit greatly by knowing the specific factors that contribute to

the development of psychological ownership. However, the process by which it develops in regards to both individual traits and contextual factors is largely unknown (Mayhew et al., 2007). With the current investigation, I plan to address this gap and accomplish the following objectives. First, this study will focus on the antecedents of job-based psychological ownership. Previous research suggests that job autonomy may be a central factor in the development of psychological ownership (Mayhew et al.; Pierce, O'Driscoll, & Coghlan, 2004). Second, to better understand why autonomy matters, it will be important to explore mediating factors that link autonomy to ownership. Pierce and colleagues (2009) posit that job characteristics like autonomy promote ownership by facilitating three key experiences: control, investment, and knowing. These more proximal factors are considered the direct "routes" to ownership and will be tested as mediators of the relationship between autonomy and ownership. Finally, in order to paint a more complete picture of how employees develop ownership feelings it will be important to understand the role played by individual traits. By integrating dispositional theory I seek to identify whether job autonomy and certain experiences can facilitate psychological ownership across a wide range of incumbent dispositions.

In summary, with this study I hope to make a primary contribution to the field of literature on employee attitudes. This will be the first study to date that examines the interactive effects of job autonomy and employee traits on psychological ownership. This research is important because it is the first to integrate dispositional research so thoroughly into psychological ownership theory. By understanding how both happy and energetic employees as well as apathetic and lackluster employees come to develop ownership, I hope to provide sound guidelines to practitioners. These guidelines would allow them to craft jobs and identify key experiences that will encourage employees of all dispositions to form healthy associations with

their work and organization. Although this is admittedly an idealistic objective, I firmly believe that *everyone*, from the grumpiest of coworkers to the obscenely chipper, deserve the chance to experience fulfilling work.

Literature Review

History of psychological ownership. Although it may sound odd, World War II (WWII) pilots are a great example of how powerful the concept of ownership can be. Being a pilot during WWII was a very dangerous job. WWII pilots and crewmen played a critical role but faced incredibly daunting threats and conditions on a daily basis. In fact, members of the US 8th Air Force (flew bombers and fighters in Europe) had a higher mortality rate than the soldiers who were fighting on the front lines (Philo, n.d., para. 10). Among the pilots themselves, those who flew and manned bombers were faced with particularly difficult odds. One statistic that is commonly cited is that only one in six bomber crewmen survived their first tour of duty over Northern Europe (Falconer, 2002). With such despicable odds, surviving pilots and crew members came to form very close bonds with their planes and regarded them as at once protectors, mothers, wives, and queens (Bond, 1952). Crewmen even named their planes and painted them with elaborate insignias and designs (i.e., nose art). Not only did they revere their planes, the bond was so strong that crewmen experienced real grief when planes were lost. They described this grief as feeling as if a part of themselves were lost as well (Bond, 1952).

The attitudes held by bomber squads towards their aircraft is a tangible example of psychological ownership at play. Their bonds illustrate how the psychological experience of ownership is distinct from formal ownership (i.e., legal ownership) in that it resides within the thoughts and feelings of the owner rather than in the pages of a deed or contract. Consequently,

people can develop feelings of ownership towards things they legally own and things they do not “own” at all (Pierce, Kostova, & Dirks, 2001; 2003).

In the field of organizational research, ownership was initially studied as a formal (rather than psychological) construct. As a formal construct, ownership represents the physical holding of equity or stock by employees. The study of formal ownership became popular in the 70’s and 80’s during a time when employee stock ownership plans (ESOP), gainsharing, and incentivization programs came to the forefront in business practices. During this time, there was a general belief that formal ownership programs would result in a host of positive outcomes, such as increased organizational effectiveness, improved job attitudes, increased retention and motivation, and more (Vanek, 1975). However, the ensuing empirical evidence was not so clear. For example, Long (1982) conducted a quasi-experimental field study of a large organization’s implementation of a formal ownership and participation structure and found no significant increase in motivation or trust towards the organization, but instead a significant *decrease* in satisfaction. Klein (1987) found no direct relationship between the percentage of company stock given to employees through ESOPs and employee satisfaction or organizational commitment.

Responding to the inconsistent and indirect findings in research on the impact of formal ownership programs, Pierce, Rubinfeld, and Morgan (1991) were the first to present a multidimensional view of ownership as operating “from both a formal and a psychologically experienced platform” (p. 126). In this seminal review, they introduced psychological ownership as an experienced state and proposed that it mediated the effect of formal ownership on employee attitudes and behaviors. In other words, giving employees a “piece of the pie” would only result in positive outcomes (e.g., motivation, performance) if employees actually saw themselves as owners (e.g., involved in decision-making). Ten years later, Pierce et al. (2001)

further refined the concept by presenting a theory of psychological ownership in organizational contexts that remains popular today. In current study, I will be utilizing this operationalization of psychological ownership, which is described in the next section.

Features of psychological ownership. Pierce et al. (2001) define psychological ownership as a cognitive–affective state where an individual feels “as though the target of ownership or a piece of it is “theirs” (i.e., “It is *mine!*”),” such that it is experienced as a part of the owner’s extended self–identity (p. 299). Psychological ownership is a relatively complex experienced state (Pierce & Jussila, 2011) that is distinct from other states like identification (i.e., the sense of oneness with a job or organization; Ashforth & Mael, 1989), engagement (i.e., a positive state characterized by vigor, dedication, and absorption; Schaufeli, Salanova, González-Romá, & Bakker, 2002), commitment (i.e., the desire, need, or obligation to remain attached to an organization; Meyer & Allen, 1991), and satisfaction (i.e., the pleasure resulting from positive appraisals of a job or organization; Locke, 1976) in that it contains several unique features (summarized in [Table 1](#)).

Connected with self–identity. First, at the center of psychological ownership is the feeling of possessiveness that emerges when psychological ties to a specific target causes the owner to experience it as an extension of their self–identity (Belk, 1988; Pierce et al., 2001). Identity is formed, developed, and influenced in social contexts as we interact and identify with external targets (Bandura, 2001). These targets can be tangible things like objects, people, and groups, or they can be relatively abstract, such as ideas and jobs (Bandura, 2001; Reed & Aquino, 2003). To a large extent, the act of possession influences the extent to which external targets become incorporated into our extended self (Belk, 1988; Furby, 1991). Holmes (1967) and others (e.g., Dittmar, 1992; Belk, 1988) argue that the psychological distance between

people and targets of ownership can become so small—especially when they play a dominant role in how they see themselves—that people incorporate these targets into part of their extended self-identity and define themselves accordingly. This is illustrated in the way that people refer to themselves as antiques collectors, computer gamers, or race-car drivers (Avey et al., 2009). Because of its focus on identity, psychological ownership is often confused with organizational identification. Both address how people identify with organizations and both are associated with positive outcomes like job satisfaction (e.g., Van Dick et al., 2004; Mayhew et al., 2007). However, whereas identification is anchored in social identity theory and addresses the cognitive component of how people come to categorize themselves, psychological ownership is rooted in theory of possession and addresses how people tend to identify themselves in relation to things they own (Pierce et al., 2001).

The English language illustrates this point in the fact that the words used to denote ownership (e.g., “mine,” “my”) are closely related to the words used to describe ourselves (e.g., “myself,” “me”). The integration of targets into self-identity is so powerful that people to experience threats to these targets as threats to their own self-efficacy and self-expression of identity (Brown, 1987; Brown, Lawrence, & Robinson, 2005). Incredibly, infringements on targets of ownership can even elicit the same fight or flight response as physical threats to one’s safety (Edney, 1974). In organizational settings, Brown and colleagues argue that employees use territorial behaviors to communicate and defend targets toward which they feel ownership. Territorial behaviors include marking (using symbols to communicate ownership) and defending (attempting to thwart infringement and/or reacting to infringements). For example, an employee might mark her new job title by placing a plaque on her office door with her name and title. If her organization goes through a merger and her new boss transfers her to a different position, she

experiences feelings of grief and anger over the loss and responds by lodging formal complaints to the VP about her new boss's leadership. All of these behaviors stem from the employee's feelings of psychological ownership towards her job. In essence, targets that we perceive as "ours" can reflect what we experience as "ourselves" (Sartre, 1943).

Cognitive and affective. Second, it is essential to note that psychological ownership is both cognitive and affective at its core (Pierce et al., 2003) in that it is characterized by the owner's thoughts and feelings towards the target of ownership (Pierce et al., 2003; Olckers & Du Plessis, 2012). Specifically, the cognitive component reflects the owner's thoughts, beliefs, and evaluations of the target of ownership (e.g., one's job or their organization). Intertwined with the cognitive component is an affective one. The affective component consists of the pleasurable feeling of ownership (e.g., it feels good to own something) and the emotional attachments between owner and target (e.g., the feeling of loss when something that is "owned" is taken away) (Pierce & Jussila, 2011). Job satisfaction and commitment are commonly studied constructs in organizational research that display certain similarities with psychological ownership. For example, psychological ownership and job satisfaction are both cognitive–affective constructs (Locke, 1976), and psychological ownership and commitment both represent a type of attachment between employee and organization or job (Allen & Meyer, 1990). However, Mayhew et al. (2007) found evidence that psychological ownership is distinct from both constructs. The substantive nature of its distinction is elaborated in [Table 1](#) below.

Table 1

Distinguishing Psychological Ownership from Similar Constructs

Areas of Distinction	Psychological ownership	Organizational identification	Job satisfaction	Organizational commitment	Employee engagement
Questions they answer	Do I feel like this job/org is mine?	Who am I in regards to this org?	How do I feel about this job/org?	Should I remain with this job/org?	Am I absorbed and invigorated?
States they represent	Cognitive–Affective	Cognitive	Cognitive–Affective	Affective	Cognitive–Affective–Motivational
Characterized by:	A sense of possession	A sense of oneness to an org	Positive feelings and pleasurable mood	Feelings of attachment and belonging	Absorption, vigor, and dedication
Developed by:	Actively imposing one’s self on a job/org	Affiliating with positive org attributes	Positive appraisal of one’s job situation	Deciding to maintain association	Job and personal resources
Theoretical anchors	Psychological theories of possession	Social identity theory	Theories of value/attainment and disposition	Social and group membership theories	Job demands–resources model

Note. Table based on information from Bakker (2011), Locke (1976), Mael and Ashforth (1992), Pierce, Kostova, and Dirks (2001), and Schaufeli and Bakker (2004).

Directed towards targets. Third, because psychological ownership exists *within* the owner and relies on the owner’s perceptions and relationship with the target, feelings of ownership can be directed toward targets that are both tangible (“my” car) and intangible (“my” opinion), and towards targets that the owner legally possesses (“my” house) or could never legally own (“my” team) (Pierce et al., 2001, 2003). Distinct from formal ownership that addresses the legal possession of things (and intellectual capital), psychological ownership focuses on the *feeling* of ownership. Organizational settings offer a similar range of targets that can be tangible (e.g., desk, office, computer, parking space) or intangible (e.g., function, idea, business, job). In these settings, people tend to develop feelings of ownership towards two targets in particular – their job and/or the organization they work for (Pierce & Jussila, 2011).

The reason for this will become clear in the following section when I review what can be “owned” in the workplace.

Experienced by all. Finally, psychological ownership can be experienced by anyone. It is not an enduring trait of personality (Van Dyne & Pierce, 2004), but rather an experienced state that “exists in the broader realm of the human condition” (Pierce et al., 2011, p. 299). Feelings of ownership serve basic human motives and can be experienced by virtually anyone in any context given the right circumstances (Pierce et al., 2001; Pierce & Jussila, 2011). This feature of psychological ownership has three important implications. First, psychological ownership is not dependent on someone’s personality, age, ethnicity, or other individual characteristics (Pierce & Jussila, 2011). Instead, stable individual difference factors like disposition or personality are expected to act as boundary conditions (Pierce & Jussila) or moderators (Wang et al., 2006) of the development of ownership feelings. Second, because psychological ownership is not limited by personal characteristics, it can be grown and nurtured virtually anywhere as long as people are provided with the right kind of experiences (Pierce et al., 2004). Third, because of the absence of a causal relationship with stable individual characteristics, psychological ownership should also not be used as a predictor in the context of employee selection. Rather, it should be emphasized in other areas of practice such as job design and work environment structure (e.g., Pierce et al., 2009; Brown et al., 2014), and employee involvement (e.g., Liu et al., 2012), and retention (e.g., Olckers & du Plessis, 2012).

In summary, psychological ownership is a complex cognitive–affect state distinct from others (see [Table 1](#)) that emerges when targets are experienced as part of one’s extended self–identity. By providing the conditions that promote the experience of psychological ownership, organizations are not only attending to their own interests (vis-à-vis the outcomes of

psychological ownership), but they are also helping their employees develop positive self-conceptions (Pierce & Jussila, 2011). Avey and colleagues (2009) note that psychological ownership “share(s) a sense of positivity and striving” (p. 174) with other positive organizational constructs such as psychological well-being and psychological capital. Because of its role as a positive resource that can help employees form positive connections between themselves and their organizations, it is safe to assume that research on psychological ownership will continue to grow in prominence and importance in both academic and applied settings.

Dark side of psychological ownership. Although psychological ownership is largely positioned as a positive construct (e.g., Avey et al.’s [2009] calls for its inclusion in POB literature) it can also promote dysfunctional behaviors. The dark side of ownership stems largely from the notion that people can become motivated not only to enhance, but also to protect and defend that which they hold (even subconsciously) as an external representation of themselves (Brown et al., 2005; Pierce & Crossley, 2011). The most often-studied negative outcome of ownership is territorialism. Avey and colleagues describe territorialism as the prevention-focused form of psychological ownership, which is characterized by preoccupation with external parties infringing on the target and defensive thoughts and behaviors.

Pierce and Jussila (2011) posit that negative outcomes of ownership may also depend on the presence of certain conditions. For example, scholars have predicted that psychological ownership could prompt information hoarding in highly competitive situations (Pierce & Jussila) while discouraging similar behaviors in collectivistic cultures (Peng & Pierce, 2015). Brown and colleagues (2005) also theorize that certain conditions during organizational change (e.g., ambiguity, perceived infringement) are likely to exacerbate the effects of ownership on displays of territoriality like defensiveness and marking behavior.

The dark side of ownership has been largely neglected in applied psychological ownership literature (Bernhard, 2011). One study by Chung and Moon (2011) found that psychological ownership was positively related to deviant interpersonal behavior. Also, Avey et al. (2009) developed an instrument to measure the dark side of psychological ownership (i.e., territoriality), but found no significant relationship between territoriality and their measure of psychological ownership ($r = .03$, n.s.). It may be that the negative outcomes of ownership depend on the presence of moderator variables such as narcissistic personality (Pierce & Jussila, 2011) or disruptive organizational change (Brown et al., 2005).

What can be “owned” in the workplace? Targets of psychological ownership.

Historically, the psychology of ownership has been studied in regards to a variety of targets, such as: childhood songs (Isaacs, 1933), treasured possessions (Kamptner, 1991), work (Holmes, 1967), ideas (Isaacs, 1933), and jobs (Brown et al., 2011). To identify targets in organizational settings, Pierce and Jussila (2011) conducted a qualitative investigation in which they asked participants to list the things in their work environment for which they and others felt ownership. Content analysis revealed a number of different targets of ownership feelings. These targets fell into nine broad categories:

1. Personal attributes (e.g., skills, competencies, knowledge, experience)
2. Mental processes (e.g., ideas, understandings, beliefs)
3. Material objects (e.g., computers, books, coffee cups, files)
4. People and relationships (e.g., supervisors, subordinates, teams, clients)
5. Spaces (e.g., office, parking lot, cubicle)
6. Responsibilities (e.g., job, task, workload, programs)
7. Work outcomes (e.g., accomplishments, plans, performance, failures)

8. Actions (e.g., leadership, helping, speaking up)
9. Social systems (e.g., organization, department, division, committee)

While employees can feel possession towards any or all of these targets, they are most likely to identify with those that are dynamic, impactful, and large in size and scope (Ozler, Yilmaz, & Ozler, 2008; Pierce & Jussila, 2011). Among the targets above, jobs and organizations are both particularly dynamic, impactful, and broad. As such, a vast majority of the psychological ownership literature has focused on either job-based or organization-based psychological ownership (Brown et al., 2011; Pierce & Jussila, 2011). In the current study I chose to focus on job-based psychological ownership for practical and analytical reasons. Practically speaking, jobs are significant because they represent a staggering investment in peoples' time and energy, and there is great utility in improving them from both company and employee points-of-view. Analytically, jobs provide the added value of allowing us to maintain consistency in levels of analysis when conducting empirical investigations of the relationships between job characteristics, job-related experiences, and job-based ownership. In the proposed study I will test a mediation in which job experiences mediate the effect of job characteristics on job-based psychological ownership. To understand how jobs and certain experiences lead to ownership, the following section will describe the origins of ownership and the causal factors that promote ownership in organizations (Pierce et al., 2001).

The roots of psychological ownership: Why do individuals develop feelings of ownership? Pierce et al. (2001) claim that psychological ownership emerges because the experience of ownership satisfies basic human motives, some of which are social and others of which are genetic. Their theory has directed the course of subsequent research on psychological ownership in organizational settings and will be expanded on in this section that describes the

roots of psychological ownership (*why* the state of ownership exists), and the following section that describes the routes of psychological ownership (*how* feelings of ownership develop).

Building on the work of previous scholars who focused on the relationships between people and possessions (e.g., Furby, 1978a; Dittmar, 1992; Belk, 1988), Pierce et al. (2001) identified three roots of psychological ownership: the need for efficacy and effectance, the need for self-identity, and the need for a place to dwell. These roots serve as the purpose for psychological ownership in the sense that they represent the motivational forces behind ownership feelings. People can experience psychological ownership towards a variety of targets as long as the targets allow these human needs to be satisfied (Pierce et al., 2003). Jobs are particularly strong targets because they allow each motive to be fulfilled. Regarding the need for efficacy, White (1959) argues that people have an intrinsic need to interact with and influence features of their environment. Targets (i.e., jobs) fulfill this by allowing people to exhibit control and experience pleasurable feelings of efficacy as a result (Furby, 1978a). Jobs can be self-revealing as employees invest much of their time, energy, knowledge, and skill into various work processes. Simultaneously, jobs can be vehicles for expressing identity (e.g., “I *am* a woodworker) and maintaining its continuity over time (Pierce et al., 2003). Jobs can also act like dwellings by fulfilling the need for security (e.g., providing regular pay) and anchoring us in time and space; both of which are characteristics of “home” (Porteous, 1976; Heidegger, 1967).

Organizations can also provide opportunities to fulfill the needs for efficacy and effectance, continuity of identity, and home (Pierce & Jussila, 2011). However, organizations also require an enormous investment of time and resources to change in meaningful ways, and even then there is evidence that a majority of organizational change initiatives do not succeed (e.g., McKinsey & Company, 2008; Smith, 2002). Therefore, by focusing on the factors that

promote ownership towards jobs, I hope to provide a more realistic set of recommendations that can be addressed and implemented with comparatively little effort. Also, in a recent study Peng and Pierce (2015) found evidence suggesting that organization-based psychological ownership may be an *outcome* of job-based psychological ownership. Therefore, I feel justified in directing this study towards job-based as opposed to organization-based ownership.

The routes to psychological ownership: How do feelings of ownership develop?

Whereas the roots describe the origins of psychological ownership by explaining how possessions can fulfill basic human needs, they do not explain *how* people develop ownership feelings for targets. The latter is addressed by the routes to psychological ownership, which represent the causal pathways by which feelings of ownership develop (Pierce et al., 2009). The phrase causal pathway is used to denote temporal precedence, such that each route is a critical experience that transforms a simple object to an integral part of one's extended self-identity (Pierce & Jussila, 2011). A recent study by Brown et al. (2014) provides some support for this distinction. In this study, they compared reverse causation models and found that their original model (job complexity → routes → psychological ownership) explained more variance and stronger model fit than alternative models that proposed different causal directions (routes → job complexity → psychological ownership, and routes → psychological ownership → job complexity).

The routes themselves are based on Sartre's (1943) work that examined the process by which people come to regard targets as part of their extended self-identity. Elaborating on that work, Pierce et al. (2003) identified three key experiences: (a) experienced control over the target; (b) investment of self into the target; and (c) intimate knowledge of the target. In the current research, these routes will play a critical role as the key experiences that mediate the

effects of job and employee characteristics on psychological ownership. Each route is described in more detail below.

Experienced control of the target. This is defined as the extent to which an employee can exercise control over work-related activities (Pierce et al., 2009). Possessions play a strong role in how people see themselves (Belk, 1988), and one of the key differences between things that individuals perceive as “mine” vs. those that they do not is control (Furby, 1978b). Exercising control over external targets not only increases perceptions of ownership, but also encourages owners to experience the targets as a part of their own self-identity (Furby, 1978a; Prelinger, 1959). It is also important to note that perceptions play an important role in control. Bandura (1995) notes that *perceptions* of control are much more relevant than actual control. This implies that, holding everything else equal, objective control over targets (e.g., one’s job) might result in different levels of experienced ownership across individuals, as their judgments are likely to vary based on other effects such as mood (see the affect infusion model: Forgas, 1995a).

Investment of self into the target. This is defined as the extent to which an employee invests their energy, focus, time, and attention to their job (Pierce et al., 2009). Much like one’s words and thoughts are “of oneself,” when employees invest their effort and energy into their labor they also come to see the fruits of that labor as representations of their selves (Pierce et al., 2003). Thus, to the extent that a job allows an employee to invest their mental, creative, technical, physical, or psychic energies into their work, they will come to feel ownership towards it. Beaglehole (1932) indicates that this is why employees often react negatively to criticisms of their work, because practically speaking it is no different than a critique of the worker him or herself.

Intimate knowledge of the target. This is defined as the extent to which an employee has a broad and comprehensive understanding of their work and is intimately familiar with what goes on in their job (Pierce et al., 2009). Beggan and Brown (1994) suggest that association with and knowledge of targets increases the strength and intimacy of the relationship between owner and target. This exemplified by cherished objects like a child's stuffed teddy-bear or a lovingly maintained '76 Volkswagen. People love those objects largely *because* they know them so well. So well, in fact, that they become part of themselves (Beaglehole, 1932). Therefore, just as farmers might come to intimately know their crops and feel at one with their land, so too might employees come to know their work and incorporate it into their sense of self.

Relationships between the routes and psychological ownership. Regarding the relationship between the routes and psychological ownership, Pierce et al. (2003) speculated that control and investment might have the greatest potential impact on ownership because they are theoretically better-aligned with the activities that assimilate objects into the self-identity. Experiencing the target as a part of the self is a distinguishing characteristic of psychological ownership (Pierce et al., 2001), and the greater the experience of control that one has over a target, the more the target will be felt as part of oneself as it satisfies the need for effectance (Furby, 1978b). Likewise, as people invest their time and energy into a target, they feel oneness with the target because it is seen as emerging from themselves and the fruits of their labor (Csikszentmihalyi & Rochberg-Halton, 1981). Intimate knowing is also a critical factor that promotes psychological ownership (Pierce et al.), in that people feel attached to those objects that they understand and are intimately familiar with. For example, given two nearly identical objects – one owned and one not owned – an individual will prefer the one they own because they know it more intimately and feel more attached to it (Rudmin & Berry, 1987). However,

knowing could also be seen as an outgrowth of the exploration and manipulation processes involved in developing an intimate relationship with an object (Pierce & Jussila, 2011).

Therefore its contributions to psychological ownership may not be as strong or direct as the experiences of control and investment.

In their mediated model of the effects of job complexity on ownership through the three routes, Brown et al. (2014) reported effect sizes consistent with this speculation, such that job-based psychological ownership was predicted strongest by investment ($\beta = .32$), then control ($\beta = .27$), then knowing ($\beta = .17$). To my knowledge, there is no research directly comparing the relative contributions of each route. Although Pierce and colleagues' (2003) speculations on the importance of control and investment seem logical, in the current study I do not formally propose an order of importance for the routes. Instead, I propose that employee traits will moderate the effect of job characteristics on two routes; experienced control over the target and investment of self into the target. In other words, I argue that the relationship between job characteristics and those routes will be different for employees of one disposition vs. those of another disposition. These arguments are elaborated on more thoroughly in the hypothesis section.

Finally, it is important to note two features of the manner in which the three routes contribute to psychological ownership. First, Pierce et al. (2003) argue that the routes are "distinct, complementary, and additive in nature" (p. 95). In other words, the experience of any single route could result in feelings of ownership irrespective of whether the other routes are utilized. Second, they posit that the experience of multiple routes should produce greater feelings of ownership than any single route by itself. These claims have strong implications on the study and application of the routes. The first point suggests that any one route may lead to the development of ownership, whereas the second point suggests that the routes should be

studied in concert and applied through a balanced perspective (i.e., one that considers all three experiences vs. an approach that leverages any one at the expense of the others). The additive nature is also relevant when considering the role played by individual differences. For example, holding all else equal, employees that invest themselves more into their work should experience greater ownership.

In summary, psychological ownership is a natural state that is rooted in basic human motives. These “roots” of psychological ownership explain why people develop feelings of ownership and incorporate external targets into their identity. They include the need for efficacy and effectance, the need for self-identity, and the need for a place to dwell (Pierce et al., 2001; 2003). In organizational settings, each of these needs can be fulfilled by jobs. For example, projects can make an employee feel efficacious, job titles can be used to communicate identity, and paychecks can provide a sense of security. Psychological ownership develops through three causal pathways. These “routes” to ownership describe key experiences that facilitate the integration of self into targets. They include experienced control over the target, investment of self into the target, and intimate knowledge of the target (Pierce et al.). Whereas the roots of psychological ownership help to identify categories of targets that best allow the three human motives to be fulfilled, the routes are more relevant for empirical study and practical application because they outline the causal pathways by which employees come to develop feelings of ownership towards their work.

The previous sections have focused on the construct of psychological ownership and the key experiences that promote it. The following sections will move backward on the causal path to identify and explore antecedents of the three routes of control, investment, and knowledge. To identify specific antecedents and place psychological ownership theory in a more familiar and

long-supported framework, the following section describes how psychological ownership fits in the job characteristics model.

Job characteristics and psychological ownership. The current study is built on the theoretical foundation of the job characteristics model (JCM; Hackman & Oldham, 1975). The JCM describes how organizational factors influence positive outcomes through their impact on key psychological states. The JCM was originally developed by Hackman and Oldham in reaction to the attitudes that characterized the industrial revolution—specifically that work was routine, simple, and mechanized. Their model describes how five job characteristics (autonomy, task identity, task significance, skill variety, and feedback) positively affect work-related outcomes (job satisfaction, motivation, turnover, performance) through the development of three critical psychological states (experience meaningfulness, experienced responsibility for work outcomes, and knowledge of results), with an individual difference variable (need for growth strength) moderating both paths (Hackman & Oldham). The overall model is illustrated in

[Figure 1.](#)

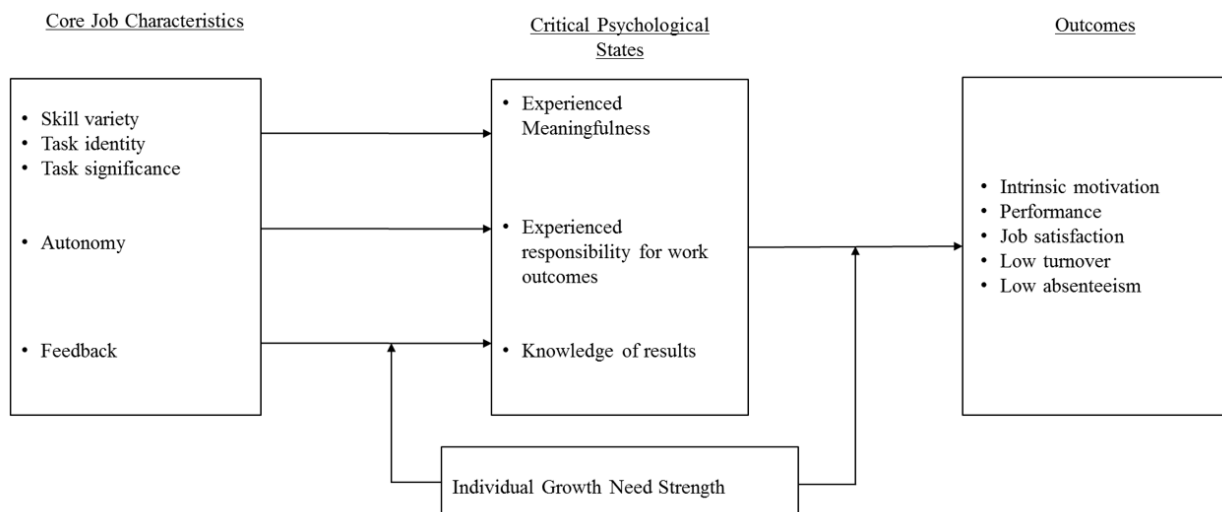


Figure 1. Job Characteristics Model. This figure shows the original JCM presented by Hackman and Oldham (1975).

The main features of the JCM remained largely unchanged for the next three decades, until recent advances in research methodology and an extensive number of empirical studies allowed for a thorough meta-analytic examination of the model in its entirety by Humphrey, Nahrgang, and Morgeson (2007). Combining the results of 259 primary studies, they found support for the central mediation path of the JCM (job characteristics → psychological state → positive outcomes) with the exception that, of the three critical psychological states, only experienced meaningfulness consistently mediated the relationship between job characteristics and work outcomes across studies. This finding, combined with the results of an earlier meta-analysis by Fried and Ferris (1987) showing a significant degree of unexplained variance in results across studies, leaves considerable room to examine the effects of other constructs on the relationship between job characteristics and outcomes.

Soon after Humphrey et al.'s (2007) results, Pierce et al. (2009) proposed a revision of the JCM, whereby the five core job characteristics provide opportunities for employees to experience the three routes (control, intimate knowing, and investment of self) which promotes job-based psychological ownership, which in turn, results in positive employee outcomes at the individual level. This revision is illustrated in [Figure 2](#) (reprinted with permission from the authors¹) and provides a helpful model to explore how psychological ownership develops as the result of common job characteristics and how ownership constructs can mediate the effect of job characteristics on outcomes.

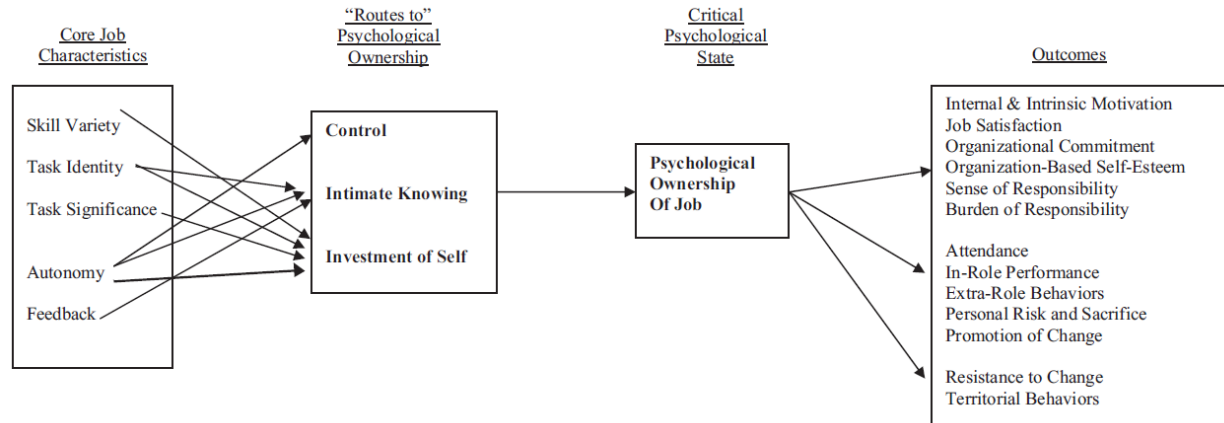


Figure 2. Revised Job Characteristics Model. This figure shows the revised JCM as theorized by Pierce and colleagues. Figure is from “Psychological ownership within the job design context: Revision of the job characteristics model,” by J. L. Pierce, I. Jussila, and A. Cummings, 2009, *Journal of Organizational Behavior*, 30, p. 485. Copyright 2008 by John Wiley & Sons, Ltd. Reprinted with permission from authors.

Pierce et al.’s (2009) revision is one of the most promising avenues for integrating psychological ownership into broader organizational theory. In [Figure 2](#), ownership replaces the three critical psychological states (shown in [Figure 1](#)) that mediate the effect of job characteristics on outcomes. Pierce and colleagues also add the three routes of psychological ownership, showing how each job characteristic corresponds to each route. Parts of this model have received support from several different studies, although the model in its entirety has yet to be tested.

Among the various aspects of this model, the mediating effect of psychological ownership and the relationship between job characteristics and psychological ownership have received the strongest support. Regarding the mediating effect, O’Driscoll et al. (2006) found evidence that psychological ownership mediates the relationship between work environment structure (conceptualized as degree of job autonomy, involvement in decision making, and personal control of technology – which resembles the JCM dimension of job autonomy) and employee attitudes and behaviors (affective commitment and self-reported citizenship

behaviors). Mayhew et al. (2007) found that job-based psychological ownership mediates the relationship between job autonomy and job satisfaction and Peng and Pierce (2015) found that job-based psychological ownership mediates the effect of experienced control on organization-based psychological ownership, which in turn had a positive relationship with job satisfaction and a negative relationship with knowledge withholding. Brown et al. (2014) found evidence that job-based psychological ownership mediates the effect of job complexity on individual sales performance. That being said, to date only one study has examined the first three paths in the revised model (job characteristics → routes → psychological ownership). In this study, Brown and colleagues found that all three routes (control, intimate knowing, and investment of self) mediated the effect of job complexity on psychological ownership in a diverse sample of employees working in a variety of industries. In the current study, I tested a model that is very similar to this. The only difference is that job autonomy – not complexity – will be the predictor, and employee trait affectivity will be added as a moderator on the *a* path.

Whereas the studies above provide partial evidence for Pierce et al.'s (2009) revision of the JCM, a more compelling test would require a direct comparison of model fit between a model that contained psychological ownership together with the other critical psychological states and one that did not contain psychological ownership. Brown et al. (2014) did just that, although their discussion of this test and their findings were limited to a single (albeit lengthy) footnote in their article. Specifically, they created a model with all four psychological states (psychological ownership and the original three states from the JCM) and examined what happened to overall fit after removing mediators. When they removed psychological ownership and kept the other three states (meaning, responsibility, and knowledge of results), they saw a significant worsening of model fit. However, when they kept psychological ownership and

removed the other three states, model fit did not change at all. This finding suggests that the original three states identified by Hackman and Oldham (1975) did not account for unique variance above psychological ownership (Brown et al., 2014). In other words, it may be that psychological ownership is “the” psychological state that matters when considering the reasons why job characteristics influence outcomes. The idea that job-based psychological ownership might be the central underlying factor in explaining how job characteristics influence outcomes is a very important finding and represents a potential game-changer for the JCM. This is also why it will be important to direct future research efforts towards the role of ownership in the JCM.

Although clear progress has been made in some areas of the JCM – Brown et al.’s (2014) work exemplifies this – there is a stark absence of research on another aspect of the model. One important factor is missing from the research described above is that none of the studies on psychological ownership assessed individual moderators of the central pathway. In the original JCM, growth need strength (GNS) referred to the individual’s need for growth and development on the job (Hackman & Oldham, 1975).

Up to the present, research on the moderating role of GNS has been plagued with inconsistent findings (Vough & Parker, 2008). Hackman and Lawler (1971) and Hackman and Oldham (1976) found that it moderated the effect of job characteristics on outcomes such as job satisfaction and on critical psychological states. However, scholars have also found countering evidence. For example, Tieg, Tetrick, and Fried (1992) found that GNS did not moderate the effect of job characteristics, and De Jong, van der Velde, and Jansen (2001) found that the moderating effect of GNS disappeared when it was preceded by openness to experience in the regression equation. The inconsistent findings surrounding the role of GNS as a moderator has

left the door open to explore how other individual characteristics interact with job characteristics to influence both the development of positive psychological states and outcomes. Along these lines, Barrick and Mount (1993) found that the relationship between autonomy and performance was moderated by personality.

In summary, the JCM has been a helpful framework for explaining how psychological ownership theory fits into the bigger picture of applied organizational research. Several studies have provided evidence of the relationship between psychological ownership and job characteristics (e.g., Brown et al., 2014; Mayhew et al., 2007), as well as psychological ownership as a mediator of the effect of job characteristics on outcomes (e.g., O’Driscoll et al., 2006). Although this line of research has been quite promising, it is far from complete. Researchers need to spend time on the left side of Pierce et al.’s (2009) revised JCM (see [Figure 2](#)) to examine how individual job characteristics promote psychological ownership through the three routes. The revised JCM can also be expanded to incorporate individual difference variables as moderators of the relationship between job characteristics and ownership. The following section will expand on this last point by discussing the role of employee characteristics in psychological ownership.

Individual characteristics and psychological ownership. Whereas the previous section addressed the mediating factors in the development of psychological ownership (e.g., how the routes mediate the relationship between job characteristics and ownership; how ownership mediates the impact of jobs on outcomes), the current section will address moderating factors in the development of ownership feelings. Addressing these factors will shift the lens of focus from jobs and experiences toward employee characteristics.

The process by which psychological ownership emerges is likely to involve complex interactions between individual characteristics and target-related factors (Olckers & du Plessis, 2012). Individual characteristics have entered the conversation as indirect factors in the development of psychological ownership. For example, Pierce and Jussila (2011) proposed individual difference variables that act as boundary conditions (or moderators) for the emergence of psychological ownership. Individual characteristics have also been proposed to influence how owners pursue targets and which targets they pursue (Pierce et al., 2003). However, employee traits have been notably absent in psychological ownership research.

Why have researchers avoided traits? A vast majority of research on the development of job or organization-based psychological ownership has focused on contextual and environmental factors that facilitate the key experiences giving rise to ownership (e.g., the routes of ownership). While the study of such factors has been promising, researchers have generally neglected the role played by stable individual difference variables in predicting psychological ownership.

There are a couple of reasons why this might be the case. First, it may be that the recent emergence of the topic has led researchers to focus efforts toward the factors that are more directly related to theorized routes, such as work environment (Pierce et al., 2004), participative decision-making (O'Driscoll et al., 2006), or job characteristics (Pierce et al., 2009). Second, researchers may have avoided employee traits because of Pierce and colleague's assertion that psychological ownership is not causally linked to personality (Pierce et al., 2001; Pierce & Jussila, 2011). More specifically, they note that identification with organizations (as it relates to fostering a sense of self) and ownership feelings can emerge in virtually anyone because they are both part of the basic human condition. Therefore, individual characteristics like personality,

disposition, or age are not theorized as *causes* of psychological ownership but as boundary conditions (Pierce & Jussila).

Psychological ownership research that examined traits. McIntyre, Srivastava, and Fuller (2009) are the only researchers to explore the relationship between personality and psychological ownership. They hypothesized that dispositional traits (locus of control and individualism) would impact feelings of organizational ownership through the underlying roots (effectance motive, self-identity motive, and place to live motive). After controlling for age, gender, and education, they found that individualism did not predict psychological ownership ($\beta = .01$, n.s.) and internal locus of control only marginally predicted ownership ($\beta = .18$, $p < .10$). Thus, they found significant relationships between all three roots and psychological ownership, but the indirect effects of personality on psychological ownership through the roots was largely unsupported. I believe these findings are due to a misguided theoretical rationale. McIntyre et al. treated the roots as mediators of the relationship between disposition and psychological ownership; conversely, Pierce et al. (2001) argues that the roots are not causal pathways but human needs that are fulfilled by ownership. The roots are still important to consider, but are better applied to identify potential targets of ownership. This is because ownership is said to emerge at the confluence of: (a) a *target* that allows one or more motives to be fulfilled and (b) the *experience* of one or more of the routes to ownership (Pierce & Jussila, 2011). Instead, McIntyre et al. assumed that ownership feelings could develop by having the right type of personality trait that is congruent with one or more of the motives. This is exemplified in their statement that “individuals with a high internal locus of control would be more likely to experience the effectance motive and, thus, experience higher levels of psychological ownership” (p. 387). Although there is merit in studying the relationship between

human motives and psychological ownership, this approach ignores the process of how ownership develops. If traits are to influence *how* ownership develops, I believe that it will be more relevant to examine their ability to color employee perceptions as to whether or not characteristics of their job provide them with key experiences (i.e., the routes) that lead directly to ownership. This implies treating traits as moderators of ownership rather than causal antecedents.

Introducing positive affectivity as a moderator of the relationship between job characteristics and psychological ownership. To expand our understanding of psychological ownership it will be important to identify the role played by individual traits. One such trait – dispositional affect – is particularly relevant in this exploration because it is among the most proximal influences on other cognitive–affective states such as job satisfaction (Judge & Larsen, 2001). Positive affectivity (PA) is a stable trait that reflects the experience of positive moods and roughly corresponds to the personality factor of extraversion (Watson & Clark, 1992). People high in PA are characteristically energetic, enthusiastic, and optimistic, whereas those low in PA are lethargic, sad, and uninspired (Watson, Clark, & Tellegen, 1988).

In light of the current study, PA is a useful trait to examine for two reasons. First, the spectrum from high PA to low PA represents a very broad spectrum of personality and disposition. People with high trait PA are happy, energetic, optimistic, and extraverted (Watson & Clark, 1992; Watson et al., 1988). On the other side of the spectrum, people with low PA are lethargic, uninspired, and sad (Watson et al., 1988). Low PA is associated with clinical depression and social anxiety (Spinhoven, Elzinga, van Hemert, de Rooij, & Penninx, 2014). Second, PA has a strong influence on how people interpret and interact with the world around them. For example, PA has been shown to influence job attitudes by its effect on sensitivity to

environmental cues and positive attributions, such that high PA employees are more receptive to positive features of their work environment and vice-versa (Judge & Larsen, 2001; Gray, 1990). At work, high PA employees see their workplace in a positive light (Watson, 2002) and experience much greater perceived organizational support (POS) than employees with low PA (Rhoades & Eisenberger, 2002). In short, PA is useful because it represents a broad range of characteristics from high to low and has been shown to influence the way in which employees interact with and respond to features of their work environment.

How might affectivity relate to psychological ownership? Identity theories present a logical place to build a theoretical foundation for why different levels of PA should change the relationship between job characteristics and job-based psychological ownership. A study by Kreiner and Ashforth (2004) found that PA was strongly associated with an increased propensity to identify with the organization, such that employees who were higher in PA were more likely regard themselves as similar to the organization for which they work. Johnson, Morgeson, and Hekman (2012) also note that there are two mechanisms by which individuals identify with external social targets, such as their organizations or teams. These include affective identification and cognitive identification. Affective identification refers to positive feelings of oneness whereas cognitive identification refers to how people think about and define their role as an organizational member (Albert et al., 1998; Johnson et al., 2012). Results from their study indicated that extraversion predicted the extent to which undergraduates experienced affective identification with their particular college (Johnson et al., 2012). Because extraversion is the trait most consistent with PA (Costa & McCrae, 1980), it is reasonable to conclude that PA plays a role in predisposing people to identify with formal social roles and groups (e.g., their team, job, organization).

In order to present a complete picture of the role played by PA it will be necessary to examine its influence on employee experiences of the key routes to ownership (experienced control, investment of self, and intimate knowing). Focusing on the routes also opens up a broader realm of research and theory – whereas there has been no research on the relationship between PA and psychological ownership per se, there has been research on the relationship between PA and two of the three routes to ownership. These two routes include experienced control and investment of self. For example, Novović, Kovač, Đurić, and Biro (2012) found that high-PA individuals were more likely to experience control over their environment in certain situations. Haase, Poulin, and Heckhausen (2012) revealed that high-PA individuals were more likely to invest their time and effort in work-related goals, whereas Krupić and Corr (2014) found that people who were more sensitive to punishment (a characteristic of low PA) expended more effort in a high-pressure situation. These studies highlight the complexity of the effects of disposition, in that high-PA individuals are likely to respond in different ways than low-PA counterparts.

Viewing these findings in light of the current study, PA should play a role in the development of psychological ownership by influencing how employees are motivated to invest their time and effort (investment of self) and whether they perceive control over their environment (experienced control). However, it is less likely that PA will influence the extent to which employees develop knowledge about their job. This route is more likely to be influenced by other factors such as organizational tenure or cognitive ability. Therefore, I will only investigate intimate knowing as a mediator of the effect of job autonomy on psychological ownership.

In summary, this literature review has explored the history of ownership and current ownership theory. This theory states that employees come to develop psychological ownership by traveling down three routes to ownership. These routes (experienced control, investment of self, and intimate knowing) are causal antecedents of ownership, but relatively little research has explored the causal antecedents of the routes themselves. The research that has been done on the antecedent side has provided evidence suggesting that job characteristics play an important role in predicting ownership (e.g., Brown et al., 2014; Mayhew et al., 2007; Pierce et al., 2004). Although this is a valuable line of research, it is limited in its scope because it ignores a key factor that may have a profound influence on the effect of job characteristics. This factor is individual traits. Specifically, traits like PA should interact with autonomy to influence psychological ownership indirectly through the routes of experienced control and investment of self.

Hypotheses

In the following section, I will outline and justify each hypothesis in my model. Because of the complex nature of this study, I have provided [Figure 3](#) below, which identifies the model in its entirety along with all proposed relationships between study variables. Each link will be described and justified in the following sections.

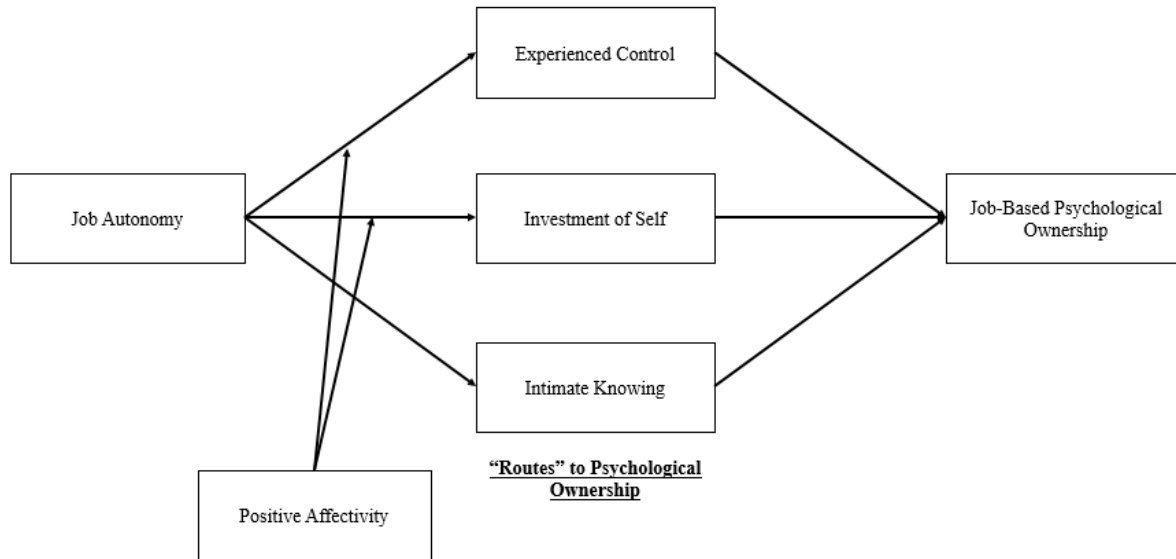


Figure 3. Full Proposed Model. This figure depicts the hypothesized links between key variables in the study. Note that positive affectivity moderates the relationship between autonomy for only two of the three routes to psychological ownership.

Hypothesis 1: Job autonomy and psychological ownership. In order to create and test a parsimonious model, I decided to include only one of the five job characteristics as the independent variable (IV) for the final study – autonomy. This was an easy choice to make for several reasons. According to self-determination theory (SDT; Deci & Ryan, 1985), autonomy is one of three core psychological needs that need to be met for individual growth and well-being (the other two are competence and relatedness). The importance of having the freedom to exert one’s will, govern and guide one’s behavior, and be causal agents in one’s life cannot be understated. It has been shown to universally promote human flourishing and well-being (Ryan, Deci, Grolnick, & LaGuardia, 2006) and has clear implications on all three routes to psychological ownership.

Regarding current ownership theory, of all five job characteristics identified by Hackman and Oldham (1975), only autonomy is theorized to provide key experiences along the three routes to psychological ownership (Pierce et al., 2009). Mischel’s (1977) conceptualization of

strong vs. weak situations provide insight into why autonomy might play such a strong role in the development of psychological ownership. In strong situations in which a great deal of structure is imposed, individual differences are constrained and behavior is tightly controlled. This can block the experience of the routes to psychological ownership and constrain the expression of the roots for psychological ownership (Pierce et al., 2003). On the other hand, high autonomy will not only allow employees to satisfy core motives like efficacy, self-identity, and stimulation (i.e., the roots of psychological ownership), but it will also provide them with ample exposure to the key experiences that serve as the routes to psychological ownership (Pierce & Jussila, 2011). This proposition has been supported by evidence from Mayhew et al. (2007) and Pierce et al. (2004). Both found similarly strong relationships between autonomy and job-based psychological ownership ($r = .37$ and $.29$, respectively).

Theory and evidence indicate that autonomy plays an important role in the development of psychological ownership. Therefore, I hypothesize that:

Hypothesis 1: Autonomy will have a strong, positive relationship with job-based psychological ownership.

Hypotheses 2, 3, and 4: The three routes as mediators. In order to extend current ownership theory into the JCM, it will be important to assess whether the three routes mediate the effect of job autonomy on job-based psychological ownership. Pierce et al. (2003) describe how employees develop ownership feelings through the routes of control, investment, and knowing. In turn, job design influences whether or not jobs will actually provide those key experiences. In their application of psychological ownership to job design theory, Pierce et al. (2009) argue that these routes mediate the relationship between Hackman and Oldham's (1975) original job characteristics and psychological ownership, such

that specific characteristics should provide incumbents with key experiences that are aligned with certain routes to ownership. Brown et al. (2014) found support this proposition when they found a significant indirect effect of job complexity on job-based psychological ownership through the three routes. However, whereas Brown et al. did serve to confirm previous assertions by Pierce and colleagues (2009), they combined all five job characteristics by their use of job complexity as the independent variable (job complexity was calculated as the average rating on all five job characteristics). To advance this theory, it will be important to explore the effect of *individual* job characteristics on psychological ownership through the three routes.

As indicated previously, of the five job characteristics only job design autonomy contributes to all three routes according to psychological ownership theory (Pierce et al., 2009). [Table 2](#) below describes how autonomy should provide employees with experiences on each of the three routes to psychological ownership.

Table 2

Variables Explaining How Autonomy Impacts the Three Routes to Psychological Ownership

Route	Relationship with Autonomy
1. Experienced Control of the Target	Autonomy should result in experienced control of the target. Incumbents who are given the freedom to make decisions and exercise their own discretion about how and when work is done, should develop the sense that they are the cause of job-related outcomes (Pierce et al., 2009). Furby (1978a) argues that when people exercise control over targets, they come to see them as part of themselves.
2. Investing Oneself Into the Target	Autonomy should result in investment of self into the job. When jobs allow more autonomy to make decisions and carry out work, incumbents are required to think more about the work and how to carry it out. This investment of thought and energy requires more investment of self than with low-autonomy jobs (Pierce et al., 2009). Targets that receive heavy investments of the owner's labor, skills, thoughts, ideas, and energies come to be seen as coming from the owner (Beaglehole, 1932).
3. Intimate Knowledge of the Target	Autonomy should result in intimate knowledge of the job. Incumbents who are given the freedom to solve problems, make decisions, and schedule their work must search for, comprehend, and apply job-related information, thus becoming more intimately familiar with their job (Pierce et al., 2009). Thus, over time, employees may come to feel at one with their jobs as they develop a strong sense of understanding and familiarity with it.

As indicated in [Table 2](#), job autonomy should promote all three routes to psychological ownership. Because these routes are theorized to be causal antecedents to ownership and have also been shown to mediate the influence of job characteristics on job-based psychological ownership (Brown et al., 2014), I hypothesize that:

Hypothesis 2: Experienced control will mediate the effect of autonomy on job-based psychological ownership.

Hypothesis 3: Investment of self will mediate the effect of autonomy on job-based psychological ownership.

Hypothesis 4: Intimate knowing will mediate the effect of autonomy on job-based psychological ownership.

Hypothesis 5 and 6: Positive affectivity as moderator. As mentioned previously, there has been no research to date on the moderating effect of PA on the development of psychological ownership. However, researchers have examined the moderating effect of PA on the relationship between environmental characteristics and similar cognitive–affective outcomes and positive states. For example, Shaw, Duffy, Jenkins, and Gupta (1999) found that PA interacted with salary to predict satisfaction with pay, such that people with low PA reported a much greater increase in satisfaction from low to high salary than those with high PA. Froh, Kashdan, Ozimkowski, and Miller (2009) found that gratitude interventions (i.e., inducing well-being by expressing gratitude) resulted in greater increases of gratitude and positive mood in low-PA participants than high-PA. They speculated that this was due to an ‘emotional ceiling’ effect, in which individuals who have high PA are less susceptible to gains in well-being because their extraverted nature (Watson & Clark, 1992) and sensitivity to positive stimuli (Watson, 1988) put them at a higher baseline. Thus, low and average-PA individuals may have more to gain from social processes that are related to positive emotional outcomes. Finally, Zautra, Affleck, Tennen, Reich, and Davis (2005) reported a similar type of interaction with introverts and extraverts, such that introverts (theoretically similar to low-PA) displayed a steeper relationship between positive events and positive daily emotions than extroverts. Zautra and colleagues interpreted this to mean that introverts had to be engaged in a greater number of positive events to “catch up” to the level of positive emotions experienced by extraverts. In the current study, if this were true we would expect to see high-PA incumbents to express more

psychological ownership across various levels of autonomy, with low-PA incumbents expressing low ownership at low levels of autonomy and a steeper slope as autonomy increases.

The moderating effect of PA has received attention in other fields as well. For example, in the field of child psychology Davis and Suveg (2014) argue that PA moderates the influence of contextual factors on positive adjustment by promoting resilience and protecting children in adverse environments. In the current study, I expect that PA will moderate the effect of job autonomy on two of the three routes to psychological ownership: (a) experienced control and (b) investment of self. The rationale for these moderating effects will be described in the following two sections.

Hypothesis 5: Positive affectivity moderates the relationship between job autonomy and experienced control. Research has long shown that depressed individuals (i.e., characteristically low PA) are *less* susceptible to the effects of what Langer (1975) described as the “illusion of control.” The illusion of control is a universal phenomenon where people fail to distinguish between situations that require skill versus those that involve luck. When people experience the illusion of control, they feel as if they can control the outcome of an event that is completely uncontrollable (e.g., gambling) by means of their actions or skill. Research on the illusion of control is now unified under a theory called the control heuristic (Thompson, Armstrong, & Thomas, 1988). According to Thompson and colleagues, people use a control heuristic to assess their own level of control or chance of success by estimating the impact of their actions and considering their desire to obtain a certain result. A recent meta-analysis by Stefan and David (2013) found that, across experiments, participant perceptions of control were much more susceptible to manipulation than other outcomes, such as level of success expected ($D = .79$ vs. $.54$, respectively). This suggests that perceptions of control over various situations –

such as the control route to psychological ownership – are particularly susceptible to this heuristic.

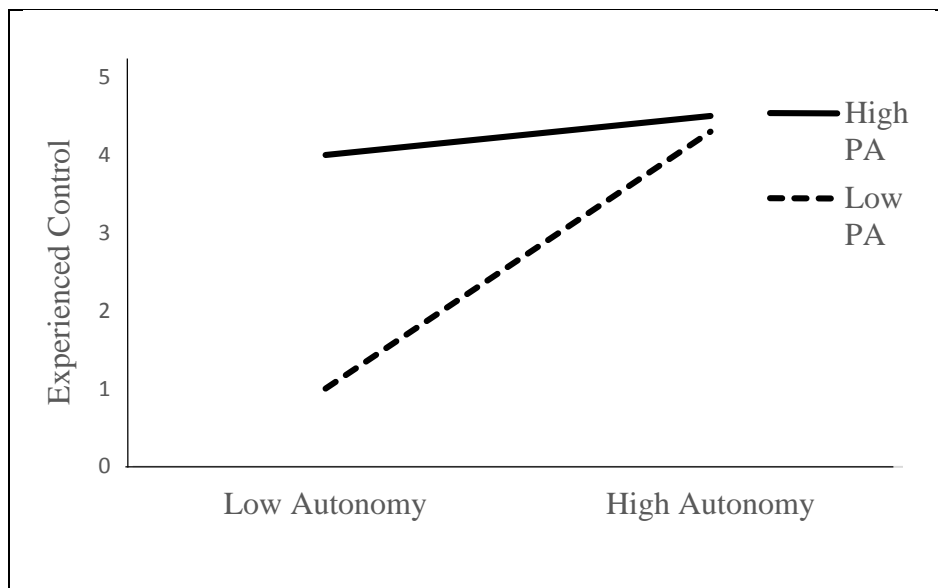
There are several factors that influence the control heuristic, and among the most important of those is mood (Martin, Abramson, & Alloy, 1984; Novović et al., 2012). A large number of studies have addressed the influence of mood and a consistent finding of this research is that a depressed mood inhibits the control heuristic whereas a positive mood encourages it. For example, Golin, Terrell, and Johnson (1977) used a dice game that involved an element of autonomy (i.e., participants were allowed to roll their own dice) and found that in the presence of this involvement, “normal” (i.e., nondepressed) participants succumbed to the illusion of control while depressed participants did not. More recently, Novović et al. (2012) revealed that trait PA (but not NA) uniquely predicted participants’ judgment of control on a task in which they were successful. This finding suggests that trait PA increases people’s tendency to experience the illusion of control.

Placing this evidence in the context of the current study, it is not unreasonable to apply Lewin’s (1935) framework and imagine that a person–situation interaction will occur between employee disposition and job autonomy. To specify this interaction I will describe how high and low–PA employees should differ in their perceptions of control at various levels of job autonomy. Due to the susceptibility of high–PA individuals to the control heuristic, at low levels of job autonomy they should perceive control over various aspects of their work than low–PA individuals. This mirrors the tendency of high–PA individuals to report greater control in situations that are ruled by external forces (Novovic et al., 2012). However, as objective control over a situation moves from external forces to internal forces (i.e., as job autonomy increases), low–PA employees who are not susceptible to the control heuristic can be expected to make

more rational judgments of control. This would be reflected by a strong positive relationship between job autonomy and experienced control among this group (i.e., steep slope). Meanwhile, high-PA employees can be expected to rely at least partially on the control heuristic when making their judgments. As a result, this group should report greater control overall and display a weaker relationship between job autonomy and experienced control (i.e., flatter slope).

Therefore, I hypothesize that:

Hypothesis 5: Positive affectivity will moderate the effect of autonomy on experienced control, with simple slopes similar to those in Figure 4 below.



*Figure 4. Hypothesized Simple Slopes for Autonomy*Positive Affectivity Interaction on Experienced Control.*

Hypothesis 6: Positive affectivity moderates the relationship between job autonomy and investment of self. In order to understand the moderating effect of PA on the relationship between autonomy and investment of self, it will be helpful to examine key characteristics of high vs. low-PA employees. I explore these characteristics below as they relate to autonomy and investment.

Regarding high-PA employees, there are two characteristics of high-PA individuals that suggest high investment of self and a weaker relationship between autonomy and investment (i.e., a higher and flatter simple slope). First, PA predisposes people to invest their energies. Specifically, PA is characterized by a “broaden and build” mentality that influences the way in which they pursue their goals and interact with their environment (Fredrickson, 2001). The “broaden and build” mentality suggests that high-PA individuals take a more active involvement with their environment and are more active in the pursuit of their goals (Lyubomirsky, King, & Diener, 2005). Evidence from several studies suggests a positive relationship between PA and investment of energy and ideas into work. For example, using an in-basket activity to assess the effect of PA on managerial decision-making, Staw and Barsade (1993) found that high-PA people were more accurate in their decisions partly because they made more use of provided data and were more likely to request additional information when needed. PA has also been associated with greater expenditures of effort. In one experiment, Hom and Arbuckle (1988) primed children to experience positive or negative affect before completing a task and found that positively primed children set significantly higher goals for themselves and performed better on the task. Sarason, Potter, and Sarason (1986) primed undergraduates by asking them to recount positive or negative events before completing an impossible maze task and measured the amount of time spent before giving up. The result was that the positively primed group spent 30% more time before giving up. In a recent longitudinal study, Haase et al. (2012) found that trait PA was positively associated with the extent to which individuals invested their time and effort in pursuing their goals and overcoming obstacles (i.e., primary control striving).

Second, PA is associated with a “ceiling effect,” whereby at some point positive changes in the environment cease to result in similar positive emotional and attitudinal outcomes in high-

PA individuals (Froh et al., 2009). This final point underlies the previous argument and provides the rationale for the weaker relationship between autonomy and investment among high-PA employees. High-PA employees should invest more of themselves regardless of the amount of job autonomy. This is because they have a greater baseline of energy to expend (Watson et al., 1988; Staw & Barsade 1993) and because they invest more of themselves in goal-related activities like jobs (Haase et al., 2012). However, as jobs increase in autonomy and the ceiling effect kicks in, high-PA employees might report smaller incremental gains in investment. Thus, for high-PA employees the relationship between autonomy and investment should be weaker (i.e., “flatter” simple slope).

Regarding low-PA employees, low-PA individuals are not predisposed to be enthusiastic or energetic. Therefore, they may be more reliant on the conditions of their work to provide them with the motivation to invest their energies. Very low-PA is a characteristic of clinical depression (Spinhoven et al., 2014), which is associated with rumination and amplifies the importance of even minor failures (i.e., punishment) by associating them with self-beliefs (e.g., “I failed to finish the report on time... I can’t accomplish anything”; Whitmer, Frank, & Gotlib, 2012; Lyubomirsky & Nolen-Hoeksema, 1995). Depressed individuals are hyper-sensitive to punishment and negative feedback and less sensitive to reward (Eshel & Rosier, 2010). The tendency towards punishment sensitivity has been shown to motivate people to invest more of their time and energy when they perceive their failure on a task to be associated with a negative outcome. This idea is reflected in a recent study by Krupić and Corr (2014) who examined the relationship between effort and sensitivity to rewards or punishment. Using a sample of university students, they found that those who were more sensitive to punishment expended significantly greater effort on exams than those who were more sensitive to rewards. Because

low-PA individuals are more sensitive to punishment (Gable, Reis, & Elliot, 2000), it seems reasonable to imagine that in situations where failure can be easily linked back to their own performance they should invest more of themselves (i.e., their time, effort, and energy) into their work to avoid failure or punishment. In the context of job characteristics, jobs with a significant degree of autonomy might act to motivate low-PA employees to expend more effort because (a) understanding that their job involves high autonomy they would also be more aware that any failure on their part can be readily attributed back to their own involvement and (b) they wish to avoid punishment so they expend more effort. In jobs with little to no autonomy there should be a less clear link between their own efforts and rewards or punishments because the lack of control that they would have over their work. In such jobs, low-PA people are likely to invest comparatively little of themselves. Therefore, for low-PA employees, the relationship between autonomy and investment of self should be comparatively stronger (i.e., steeper simple slope when compared to high-PA).

Above, I argue that the nature of the relationship between autonomy and investment of self will be different for employees with high vs. low PA. High-PA employees tend to invest themselves more but also reach a ceiling effect, while low-PA employees will invest more of themselves as their work becomes more autonomous to avoid failure. For those reasons, I hypothesize that:

Hypothesis 6: Positive affectivity will moderate the effect of autonomy on investment of self, with simple slopes similar to those in Figure 5 below.

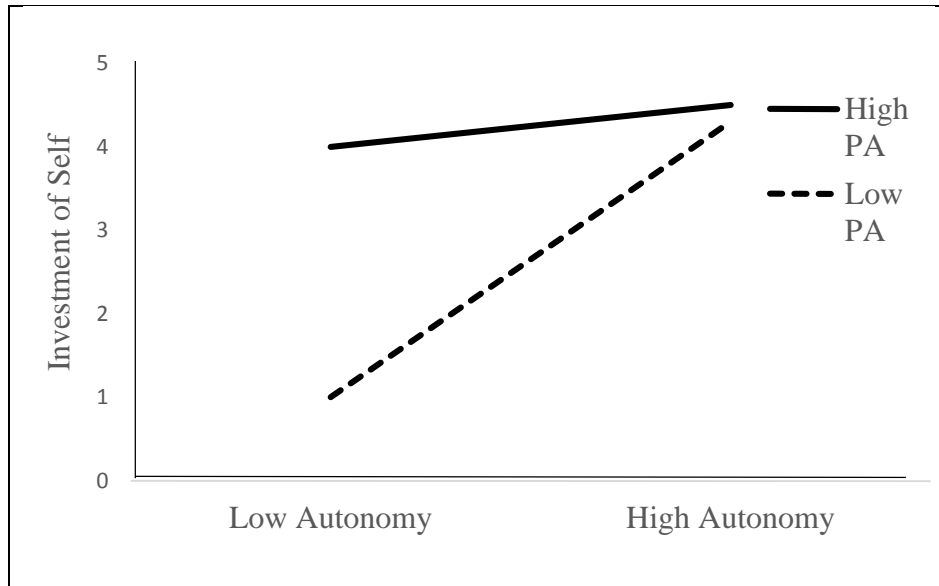


Figure 5. Hypothesized Simple Slopes for Autonomy*Positive Affectivity Interaction on Investment of Self.

Putting it all together: A moderated parallel-mediation model. By combining the six hypotheses described above into a single model, a complete picture of all hypotheses is provided in [Figure 6](#) below. In this figure, color is applied to highlight individual hypotheses.

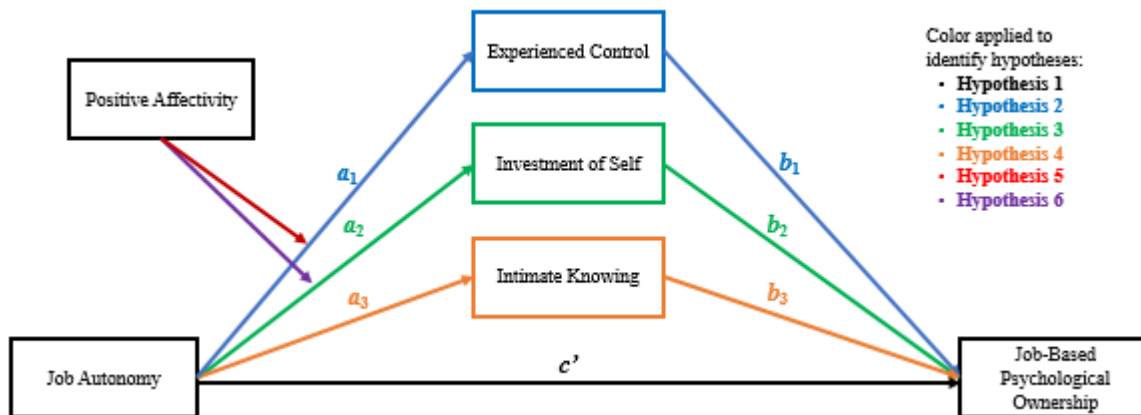


Figure 6. Full Moderated Mediation Model with Hypotheses. This figure shows the hypothesized links between key variables in the study, with color added to the model paths to promote ease of interpretation.

CHAPTER II

Method

This study utilized an online crowdsourcing platform to collect data from individuals with either part-time or full-time jobs who live and work in the US. Below I present information on how data were collected and screened, the measures that were used, and the analyses that were applied to test hypotheses.

Participants

Data collection via Mechanical Turk. Participants for this study were recruited from Amazon's Mechanical Turk (MTurk). MTurk is a crowdsourcing platform that has been used to recruit participants for a variety of studies in social and organizational sciences over the past half-decade (Behrend, Sharek, Meade, & Wiebe, 2011). In MTurk, workers can search for and participate in Human Intelligence Tasks (HITs) that are paid for by requesters. HITs are simply tasks that require a person to complete. Examples of HITs include choosing appropriate categories for various products, transcribing audio recordings, translating written paragraphs, proofing or copy-editing texts, participating in research studies, and completing customer surveys. When workers successfully complete a HIT, requesters review their work and approve a specified payment that is transferred directly into the worker's account.

MTurk has become increasingly popular among organizational researchers, and several studies conducted through MTurk have been published in top-tier psychology journals (e.g., Buhrmester, Kwang, & Gosling, 2011; Halkjelsvik & Rise, 2014; Phillips, Gully, McCarthy, Castellano, & Kim, 2014). Using the MTurk sample pool had several advantages for the current study. First, demographics from US MTurk samples are more representative of the broader US population than university samples (Paolacci, Chandler, & Ipeirotis, 2010; Buhrmester et al.,

2011). This helped to increase external validity of this study (Shadish, Cook, & Campbell, 2002), as findings from a broader and more diverse sample of “Turkers” (i.e., MTurk workers) should be more generalizable to US workers when compared to undergraduate students. Second, due to the low cost of collecting data on MTurk I was able to recruit a large and well-powered sample that, all else equal, should better reflect the US workforce than less-powered samples (Paolacci & Chandler, 2014). Finally, most Turkers are also employed full-time (Mason & Suri, 2012), and in the current study relatively few respondents needed to be screened out due to respondents who were unemployed and thus unable to provide accurate assessments of job characteristics and job-related experiences.

There are also disadvantages of using MTurk. Although MTurk samples are diverse and more representative than other conventional samples (Paolacci et al., 2010), they are not truly representative of the larger population. Overall, Turkers tend to be younger, more educated, more female, and more politically liberal (Berinsky, Huber, & Lenz, 2012; Harms & DeSimone, 2014; Paolacci et al., 2010). Scholars have also warned about the quality of data provided by Turkers (Chandler, Paolacci, & Mueller, 2013), unengaged and/or careless responding (Meade & Craig, 2012), and worker honesty (Chandler et al., 2013). Low quality data from MTurk studies results in the screening of 15% of responses on average (Harms & DeSimone, 2014). In response to these disadvantages I followed recommendations for pre-screening participants, identifying careless responders, and screening out low-quality data. This will be more thoroughly described below.

Requirements for participation. This study used a convenience sample of MTurk workers who self-selected to participate. In order to collect a sample of US workers who are not self-employed, and to ensure quality data, participants needed to meet four characteristics. If

participants did not meet all four characteristics they were not allowed to participate in the study. First, participants had to have an approval rating of 95% or higher. This means that they must have been approved for 95% or more of the previous HITs they participated in through MTurk (e.g., a Turker who participated in four surveys but was denied payment for one of them because they failed “attention check” items or left half the survey blank would have a 75% approval rating). This requirement is based on Peer, Vosgerau, and Acquisti’s (2014) evidence that workers with a 95% or higher approval rating pay closer attention and provide higher quality data than low-reputation workers. Turkers who did not meet this requirement were not able to see or click on the HIT.

Second, participants had to have IP addresses within the United States. This requirement stems from Pierce and Jussila’s (2011) proposition that psychological ownership may be sensitive to culture, such that personal feelings of ownership are more likely to develop in nations with individualistic values (e.g., US, Canada) while collective ownership is more likely in nations with collective values (e.g., China, Cuba). When location requirements are not employed in MTurk studies, sample demographics show around 30% or more of the respondents are from India (e.g., Paolacci et al., 2010). By collecting data only from US workers I can also be more confident that cultural values are not systematically biasing my results. Turkers who did not meet this requirement were also not able to see or click on the HIT.

Third, participants had to be employed and work in a location outside of their own home. Current employment was important for the obvious reason that one must have a job to assess job characteristics, key experiences, and attitudes. Fourth, participants were also required to be employed by a company other than MTurk and work in a location other than their home. This was important for two reasons. First, self-employed people that work from home (i.e., away

from bosses or coworkers) may systematically respond differently when evaluating things like job autonomy or intimate knowing. Second, this requirement helped me to screen out the small population of Turkers who consider MTurk as their full-time job. These “dedicated Turkers,” who make up 10% of the worker population and are responsible for 41% of HIT completions have been shown to provide data with less variance and more leptokurtic distributions when compared to non-habitual Turkers (Deneme, 2009; Harms & DeSimone, 2014). There is some evidence suggesting that dedicated Turkers do not produce different results when compared to non-habitual Turkers (e.g., Berinsky et al., 2012). However, because dedicated Turkers tend to consider MTurk as their full-time job, they are not ideal targets for research on traditional employee-job-organization relationships and attitudes. This requirement was assessed using two self-report questions that were placed at the beginning of the survey.

Sampling procedure. To collect data a HIT entitled *Workplace Survey* was placed on MTurk on Saturday, May 9th, at 9:45AM and remained active until Saturday, May 9th, at 9:15 PM when the last respondent submitted their survey. During that time a total of 536 participants were recruited. The HIT contained the description *This survey will ask you questions about yourself and your current job (only people who work outside of their homes please)* and had the following keywords: *job survey, workplace survey, job, employee, questionnaire, survey, and research*. MTurk workers could find this HIT by scrolling down the list of available HITs, or through searching by specific keywords associated with the study. When participants clicked on the HIT, they saw a more detailed description of the study before deciding if they wanted to participate (reproduced in [Appendix F](#)). After deciding to participate in the HIT, MTurk workers entered their worker ID and were directed to the Qualtrics survey website through a provided link.

All 536 participants gave informed consent (form provided in [Appendix E](#)) and were taken to the qualifying questions. The first question asked “*Are you currently employed at least part-time (i.e., you work 20 hours per week or more on average) by an organization other than Mechanical Turk?*” Three participants (0.6%) responded “no” to this item and were removed from the survey immediately. The next item asked “*Do you do a majority of your work from home?*” Thirty-six participants (6.8%) responded “yes” and were immediately removed from the survey.

Thus, of the original 536 people who responded to the HIT on MTurk, 39 (7.3%) were immediately removed from the survey without pay for not meeting requirements. It is important to note that, had they taken the time to read the description of the survey in MTurk, the informed consent, or the introduction to the survey itself, they would have seen the requirements (often in bold and underlined) that participants must be employed at least part-time and work primarily from a location other than their own home. The remaining 497 respondents were permitted to complete the survey. On average, it took them 9.26 minutes ($SD = 4.39$) to complete the study and give consent. With the \$0.50 payment for completing the survey, this resulted in an average wage of \$3.24/hr.

Screening methods to ensure quality data. To promote high-quality data, I employed several methods to identify and screen out poor data. These included the use of instructed response items and a self-report data quality item, as well as post-hoc analysis of IP addresses and self-reported nationality.

Data screening is an important process in any research, but particularly in research that utilizes MTurk samples. Harms and DeSimone (2014) report that, on average, researchers that utilize MTurk dismiss 15% of their data due to issues with quality (e.g., selecting “agree” on

every item, completing a 100–item survey in less than one minute). In comparison, researchers utilizing college undergraduate populations exclude between 10–12% of their data on average (Meade & Craig, 2012). To mitigate against careless responding, I followed recommendations from Meade and Craig (2012) by including “instructed response items” (IRIs). Three IRIs were placed randomly throughout the survey which asked participants to select a particular response (e.g., “Please select ‘Disagree’ for this item”). Participants who did not correctly respond to all three items were removed from analysis. This process is a powerful method for identifying paid survey-takers who are answering questions at random or without purpose.

Moreover, at the end of the survey I presented respondents with a self-report single item indicator (SRSI) of data quality that asked whether or not I should use their data for the study. Meade and Craig (2012) report that survey respondents tend to be forthcoming when presented with this type of item, and their research found that it was a more sensitive indicator of careless responding than many other indicators including response time and psychological antonyms. The wording of this item was based on a study by Rouse (2015), who found that its inclusion was associated with higher scale reliability estimates. The item read, “*Realistically, I know some MTurk respondents do not pay close attention to the questions they are answering. This affects the quality of my data. Please select one of the following honestly. Your answer is confidential. It will not affect whether or not you receive payment and will not affect any rating given to you for your work. Did you pay attention and answer honestly?*” Participants could respond with *Yes, keep my data* or *No, delete my data*. Those who selected *No* were be screened from subsequent analysis.

Also, repeated IP addresses, IP location tags*, and self-reported nationality were used to screen out respondents who may have taken the survey multiple times through “dummy”

accounts (repeated IP address), used software to fake a US IP address (IP location tags), and otherwise were not US citizens but made it through previous screens anyways (self-report nationality item).

Screening results. After all of the 497 responses were collected and the survey was taken down from MTurk, data were checked for quality and screened when respondents failed to meet all quality criteria. These included the three IRI attention-check questions, the SRSI self-report quality item, self-report nationality, multiple repeated IP addresses, and IP locations outside of the US. Results from each method are provided in [Table 3](#) below; respondents coded with a “1” on one or more screening method were screened from analysis. Of the original 497 responses, 71 (14.3%) were screened while the remaining 426 were included in all subsequent analyses. This proportion is very similar to the 15% reported by Harms and DeSimone (2014) as the average percent of data from MTurk samples that is screened due to quality concerns.

Table 3
Data Screening Methods and Results

Screening Method	Coding Definition	N Screened (%)
IRI	0 = Responded correctly to all three IRI	44 (8.9%)
	1 = Responded incorrectly to one or more IRI	
Repeated IP Address	0 = Unique IP address or repeated once only	18 (3.6%)
	1 = Same IP address for multiple responses (8+)	
IP Location	0 = IP address is within the US	11 (2.2%)
	1 = IP address is outside the US	
Self-Report Nationality	0 = Reported living and working in the US	2 (0.4%)
	1 = Reported living and working outside the US	
SRSI	0 = Reported “Yes, keep my data”	5 (1.0%)
	1 = Reported “No, delete my data”	
TOTAL	0 = Data included in final analyses	71 (14.3%)
	1 = Data screened from final analyses	

Note. ($N = 497$). IRI = instructed response item; SRSI = self-report single-item indicator of quality. Many respondents were flagged with multiple indicators (e.g., failed IRI and IP located outside of the US).

Participant characteristics: Final sample. The final sample of 426 was composed of males (60.4%) and females (39.6%) who ranged in age from 18 to 71 ($M = 33.4$, $SD = 10.3$) and reported current job tenures that ranged from weeks to 40 years ($M = 5.0$, $SD = 5.0$). A majority of participants described their jobs as being either entry-level, individual contributor, or technical/professional status (68.5%). Many reported working in supervisory or mid-level roles (28.6%), and very few were in senior leadership roles (2.8%). Work-related demographics are provided in [Table 4](#).

Table 4

Participant Work-Related Demographics

Total work experience (years)	
Mean	13.35
SD	9.30
Range	48.00
Tenure in current position (years)	
Mean	5.04
SD	5.03
Range	40.00
Job level (% of sample)	
Entry-level or intern	23.7%
Individual contributor	31.0%
Supervisor or team lead	17.8%
Mid-level manager	10.8%
Senior manager	2.8%
Technical or professional	13.8%
Other	0.2%

Note. ($N = 426$).

Sample size and power. Sample size is positively related to power, and power is defined as the probability of finding significant relationships when they truly do exist (i.e., rejecting the null hypothesis when it should be rejected). Using Cohen's (1988) rule of thumb that power should be greater than 0.80, and guidelines by Preacher, Rucker, and Hayes (2007), to achieve a power of at least 0.80 in a moderated mediation model with medium effect sizes (i.e.,

regression coefficients between .30 and .40) and a 95% confidence interval, I needed a sample size of around 100. However, these guidelines do not address sample size for moderated mediation models that include multiple mediators acting in parallel. To find guidance along these lines I reviewed other studies with parallel mediation. One study by Luby et al. (2013) used a sample of 145 to test a mediation model with three parallel mediators and no moderators. In another study, Bamberger and Belogolovsky (2010) used a sample of 139 to test a model with one IV, three parallel mediators, one DV, and one moderator (however their IV was a dichotomous experimental condition).

Taking the studies above, Preacher et al.'s (2007) guidelines, and Harms and DeSimone's (2014) finding that 15% of MTurk data is excluded due to quality concerns, I collected over 500 responses and was left with a useable sample size of 426. This left me with more than enough power to test my hypotheses.

Measures and Covariates

To test the proposed hypotheses, I employed a number of different measures. Each of the measures are described below. Following a description of these measures is a section describing the covariates that were measured and included in subsequent analysis. It is also important to note that the survey included other measures besides the ones described below. These measures were included to create psychological distance between predictor and outcome variables and help alleviate some of the validity concerns surrounding cross-sectional studies by "hiding" the independent variable (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). These include measures of negative affectivity (PANAS; Watson et al., 1988), task identity, task significance, skill variety, feedback (JDS-R; Idaszak & Drasgow, 1987), self-efficacy, accountability, sense of belongingness, self-identity, and territorialism (POQ; Avey et al., 2009), and job satisfaction.

Positive affectivity. PA was measured using the positive affect items from the general timeframe version of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). This ten-item instrument measures the extent to which one experiences positive emotions, feelings, and moods in general. Participants were asked to rate the extent to which they experience ten different positive emotions overall, using a rating scale of 1 (*very slightly or not at all*) to 5 (*extremely*). Sample items include “Enthusiastic,” “Interested,” “Inspired,” and “Excited.” Responses for each item were coded on a scale of 1–5 then aggregated into a mean PA score, with higher scores indicating greater trait levels PA. Adequate levels of internal consistency (.87) for PA was established using a sample of 900 US residents recruited through MTurk (Schütz, Nima, Sailer, Andersson–Arntén, Archer, & Garcia, 2013). Watson et al. (1988) also confirmed that PA scale correlated negatively with measures of depression and general distress. Watson and Clark (1994) also report strong convergence on self- and peer-ratings. In the current study this scale displayed strong reliability ($\alpha = .909$; $CR = .908$).

Job autonomy. Job autonomy was measured using the three autonomy items from the Job Diagnostic Survey–Revised (JDS–R; Idaszak & Drasgow, 1987). This survey assesses employee perceptions of five specific job characteristics, including autonomy, task identity, task significance, skill variety, and feedback from the job. The original format of the JDS–R was used in the current study, such that descriptions were provided to describe low, medium, and high anchors for certain items. The only difference was that, in the current study, participants used a sliding bar to indicate their response. A sample item includes “How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing the work?” Responses for the three autonomy items were coded on a scale from 1–7 then aggregated into a mean job autonomy score for each participant, with higher scores

indicating greater autonomy in completing one's work. Data were also collected on the other job characteristics but were not included in analysis. The rationale for this is due to the sensitivity of MTurk workers to demand characteristics, meaning it was important to avoid signaling the aims of this study (Berinsky et al., 2012). Adequate levels of internal consistency (.72) for the autonomy dimension of the JDS-R was established using a sample of 677 working adults (Buys, Olckers, & Schaap, 2007). No reliability evidence for US working adults on MTurk has been established. In the current study this scale displayed strong reliability ($\alpha = .861$; $CR = .865$).

Routes to psychological ownership. The three routes to ownership were measured using the multidimensional Routes to Psychological Ownership scale developed by Brown et al. (2014). This 15 item scale is broken out into three dimensions of experienced control, investment of self, and intimate knowing. In each dimension, participants used a scale from 1 (*strongly disagree*) to 7 (*strongly agree*) to rate the extent to which they experience control over their work, invest their effort and energy in their work, and have a deep understanding of their work. There are six items in the experienced control dimension, for example "To what extent do you have influence over the things that affect you on the job?" There are five items in the "investment of self" dimension, for example: "I have invested a major part of "myself" into this job." There are four items in the intimate knowing dimension, for example "I am intimately familiar with what is going on with regard to my job." Responses were aggregated into mean scores for each dimension separately, such that higher values represent higher levels of control, investment, or knowledge of work.

Adequate levels of internal consistency have been established for experienced control (.94), investment of self (.92), and intimate knowing (.92) using a sample of 227 working adults from a variety of organizations in the Singapore area (Brown et al., 2014). In developing these

scales, Brown et al. (2014) used confirmatory factor analysis (CFA) to confirm that the three routes are distinct from each other and from job-based psychological ownership. However, because these scales have only recently been developed, they have yet to be deployed in a study involving US working adults. In the current study, experienced control ($\alpha = .925$; $CR = .923$), investment of self ($\alpha = .917$; $CR = .913$), and intimate knowing ($\alpha = .910$; $CR = .913$) all displayed strong reliability.

Psychological ownership. Job-based psychological ownership was measured using the six item Job-Based Psychological Ownership Scale (Brown et al., 2011). This survey measures an individual's feelings of possession and ownership towards their job. Participants were asked to rate the extent to which they feel ownership towards their job by rating their agreement on six items, using a rating scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "I sense that this job is *mine*," and "I feel a very high degree of personal ownership for this job." Responses were aggregated into a mean job-based psychological ownership score, with higher values indicating stronger feelings of psychological ownership towards one's job. Adequate levels of internal consistency (.93) for the job-based psychological ownership scale was established using a sample of working adults in the US (Brown et al., 2011). No reliability evidence for US working adults on MTurk has been established. This particular scale is new and has yet to accumulate a great amount of validity evidence. However, Brown et al. (2011) found the factor structure and reliability to be convergent across US and Singapore samples. In the current study this scale displayed strong reliability ($\alpha = .953$; $CR = .946$).

Covariates. Participants were also asked a number of demographic items. These items include age, gender, job title, industry, current work status, job level, tenure, total years of work experience, and nationality. Tenure is likely to influence psychological ownership; employees

who work in the same job for multiple years may also come to perceive that they have a strong and intimate understanding of that job (Olckers & Du Plessis, 2012; Ozler et al., 2008). Age may also influence psychological ownership; Peirce et al. (2003) describe that the motives of ownership (i.e., efficacy, identity, and belongingness) may change in strength over the lifespan, although in what direction has yet to be tested. Gender has been shown to influence psychological ownership; Ozler et al. (2008) found that the men in their sample of Turkish university staff displayed significantly more ownership than the women. Therefore, the covariates of (a) job tenure, (b) age, and (c) gender were used as covariates.

Research Design and Statistical Analysis

Research design. This study employed a cross-sectional research design to collect data on all measures at a single point in time. In this design, participants assessed the characteristics, experiences, and attitudes towards their current real-life job. The decision to employ a cross-sectional survey was also guided by the results of a pilot study that suggested job autonomy was not amenable to manipulation via the use of vignettes in an online survey. The process of assessing job characteristics is complex and dynamic; in order to make determinations about job characteristics, incumbents rely on both objective cues and social informational cues (O'Reilly & Caldwell, 1979). By manipulating job autonomy via vignette (e.g., “imagine working in a job with high/low autonomy, then rate the following”), participants were required to respond in a social vacuum. This resulted in an experimental demand characteristic which led to inflated relationships between constructs ($r > .90$) and biased responding (Gove & Geerken, 1977). In other words, by telling a participant to imagine working in job X, their responses were a combination of (a) a half-informed understanding and (b) their best guess as to what the researcher expects to see.

Statistical analyses. The true aim of this research is to test a revised model of how employees with different trait dispositions develop feelings of ownership towards their work. Recent advances in analytical tools allowed me to test the proposed model in its entirety using PROCESS and structural equation modeling (SEM). PROCESS was developed by Hayes (2013) and was employed using SPSS v.22, and uses ordinary least squares regression to estimate various patterns of relationships between variables, or models (e.g., moderation, mediation, moderated mediation, serial mediation, etc.). I followed recommendations by Hayes by taking a piecemeal approach, where parts of the model were tested and confirmed before analyzing the model in its entirety (e.g., mediation analysis, then moderation analysis, then moderated mediation analysis). In analyses that included interaction effects, variables were mean-centered prior to computing interaction terms, and heteroscedasticity-consistent standard errors were used. The final model shown in [Figure 6](#) is a moderated parallel-mediation model that most closely resembles PROCESS model number seven (Hayes, p. 447). This model can also be described as a conditional indirect effect, such that the indirect effect of job autonomy on psychological ownership through the routes is conditional on employee trait PA.

AMOS v.22 (Byrne, 2010) was employed to calculate estimates that are currently unavailable through PROCESS, including chi-squared (χ^2) and model fit indices (e.g., *CFI*, *RMSEA*). It was also used to assess the reliability, convergent validity, discriminant validity, and factorial validity of the measurement model, to evaluate method bias, and to conduct exploratory path analyses to follow-up on results.

Hypotheses were tested using bootstrapped confidence intervals via PROCESS and bias-corrected bootstrapped confidence intervals in SEM. Concurrent with bootstrapped estimates, all *p*-values are reported in the results section are two-tailed. Regarding the moderated mediation

hypotheses, the indirect effect of job autonomy on psychological ownership through experienced control and investment of self should be conditional on PA. To test this I calculated 95% bias-corrected bootstrap confidence intervals of the indirect effect at various levels of PA. This effect would be supported to the extent that (a) higher levels of PA are associated with smaller indirect effects (of autonomy on ownership through control and investment) may or may not include zero in the bootstrapped confidence intervals, and (b) lower levels of PA are associated with larger indirect effects that do not include zero in the bootstrapped confidence intervals.

By testing the model in its entirety I avoid issues associated with previous methods for moderated mediation, such as the subgroup approach (i.e., splitting the data into groups based on the moderator variable then conducting separate mediation tests on each group and comparing the results). Using that approach would have resulted in lower statistical power and forced me to split my continuous moderator (PA) into subgroups, thus discarding information and potentially leading to biased estimates (Edwards & Lambert, 2007).

Finally, due to the cross-sectional nature of the study causality cannot be inferred. Therefore, to rule out alternative models and provide stronger support for the causal directionality of the hypotheses, I conducted a reverse causation analysis (e.g., Brown et al., 2014). This was done using a path-analytic approach in AMOS to compare model fit between the proposed model ([Figure 6](#)) and several other models with different causal pathways (e.g., from routes to job autonomy to ownership; from ownership to routes to job autonomy). To the extent that the original model shows stronger fit estimates (e.g., χ^2 , *RMSEA*, *CFI*, R^2) than reverse causation models, the inferences based on findings are strengthened while alternative causal models are ruled out.

CHAPTER III

Results

Missing Data

Non-screened data were analyzed and managed for missingness with the multiple imputation tools in SPSS 22. This dataset consisted of 426 cases and 77 variables (demographics or other categorical variables were not included). Twenty one percent of the cases and 66% of the variables had some missing data. The variable with the highest missingness was the faces scale from the job satisfaction measure, which had 4.0% missing ($N = 17$). In this item, participants were presented with seven pairs of male and female faces that ranged in expression from happy and smiling to upset and frowning and were asked to “*Consider all aspects of your job. Select the face pair that best describes your feelings about your job in general (buttons are below the faces.*” After this, three items had 1.2% missing ($N = 5$) while all other items had less than 1.0% missing.

Regarding individual respondents (i.e., rows of data), no participants exceeded the cutoff of 24% missing. Seventy eight percent of the 426 respondents answered every question on the survey. Of the 94 respondents who did not answer every question, a vast majority (83%) left only one item blank. The highest percent missingness across all respondents was 8%. Overall, 99.6% of the individual cells in the database (rows*columns) had complete data. These results indicate a very low level of missingness. With such low levels of case-level missingness, parameter estimates are not expected to be significantly biased (Enders, 2010) so it was not necessary to conduct formal tests of missing data patterns (e.g., Little’s MCAR test; Little, 1988). Likewise, a visual inspection of missing value patterns indicated the general, or haphazard pattern as described by Enders, suggesting that data are missing at random (MAR).

Preliminary Analyses

Before testing any hypotheses, I calculated scale scores and ran preliminary analyses to assess normality, reliability, and method bias. Scale scores were computed using person-mean imputation to calculate mean scores for individuals who completed at least 80% of the items (Bono, Ried, Kimberlin, & Vogel, 2007). When less than 80% of the items in a scale were completed, scale scores were left blank.

Normality and reliability. Item and scale normality were not assessed using skewness or kurtosis values due to the large sample size. Field (2009) notes that samples of 200 or more give rise to small standard errors that result in significant z-scores for skewness, even when data are normally distributed. Instead, a visual inspection of histograms revealed adequately normal distributions for study variables, with slight negative skews in the distributions of the intimate knowing and job-based psychological ownership scales (i.e., greater frequencies around the higher end of the scales). No transformations were made to any items or scales. Reliability was assessed using Cronbach's Alpha (α ; see [Table 5](#)) and Composite Reliability (*CR*; see [Table 14](#)). All scales displayed adequate reliability. A summary of the descriptive statistics, reliability, and correlations between scales is provided in [Table 5](#).

Table 5
Bivariate Correlations, Descriptives, and Reliabilities among Main Variables

Variable	<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6	7	8	9
1. Age	33.40	10.29	53	---								
2. Gender	.60	.49	1	-.223**	---							
3. Tenure	5.04	5.03	40	.465**	-.024	---						
4. Autonomy	4.96	1.33	6	.182**	-.107*	.131**	.861					
5. Control	4.23	1.33	6	.101*	-.023	.127**	.691**	.925				
6. Investment	5.15	1.32	6	.259**	-.094	.243**	.547**	.580**	.917			
7. Knowing	5.95	0.96	6	.211**	-.132**	.204**	.338**	.343**	.441**	.910		
8. PA	3.27	0.81	6	.109*	-.008	.066	.319**	.374**	.414**	.357**	.909	
9. Psych Own	5.23	1.40	6	.139**	-.080	.147**	.506**	.572**	.644**	.380**	.383**	.953

Note. ($N = 426$). Autonomy=job autonomy; Control=experienced control; Investment=investment of self; Knowing=intimate knowing; PA=trait positive affectivity; Psych Own=job-based psychological ownership. Gender was coded where 0 = female. Bold values on the diagonal represent Cronbach's Alpha. ** $p < .01$; * $p < .05$.

Method bias. To assess common method variance, I conducted two separate diagnoses.

This included a Harman's single-factor test in SPSS and a single-common-method-factor test of the final CFA model in AMOS. Harman's test is traditionally used to estimate the amount of variance due to a single common method factor (see Podsakoff et al., 2003). To conduct this test, I used exploratory factor analysis to see how much variance across all items could be attributed to a single factor (using principal components analysis as the extraction method and no rotation). The results indicated that the method factor accounted for 30.7% of variance among all items, which was much less than the 50% cutoff that would indicate a serious threat to the study's internal validity if uncorrected.

Podsakoff et al. (2003) note that methods based on CFA to assess common method variance tend to be the most rigorous. Although Harman's single factor test revealed that method variance was not likely an issue in the current study (30.7% of variance due to a single factor, which was far below the 50% cutoff), the use of a single-time online survey to collect data warranted a more refined test of method bias. To do this, I applied the single-common-

method-factor approach (also known as the unmeasured latent method construct; Williams, Cote, & Buckley, 1989) in AMOS where I created a common latent factor (CLF) which was loaded reflectively onto all items in the CFA (Podsakoff et al.). A more detailed description of this analysis is provided in [Appendix A](#) and summarized here. Specifically, results indicated that 36% of the variance among items in the measurement model could be attributed to a single common latent factor. This result comports with Harmon's test and suggested that method bias did not pose a significant overall threat. Item loadings were also compared with and without the CLF to determine how method effects were distributed (Richardson, Simmering, & Sturman, 2009). Results indicated that method bias seemed to have substantive effects only in the PA dimension. In that dimension, more than half of the items showed significantly weaker loadings after including the CLF. Therefore, because both tests suggested that method variance was below the threshold, and because method bias appeared to be restricted to only one dimension, no remedies or techniques to control method bias were required. This also justified the use of PROCESS (Hayes, 2013) to test the hypotheses, re-stated below.

Hypothesis 1: Autonomy will have a strong, positive relationship with job-based psychological ownership.

Hypothesis 2: Experienced control will mediate the effect of autonomy on job-based psychological ownership.

Hypothesis 3: Investment of self will mediate the effect of autonomy on job-based psychological ownership.

Hypothesis 4: Intimate knowing will mediate the effect of autonomy on job-based psychological ownership.

Hypothesis 5: Positive affectivity will moderate the effect of autonomy on experienced control.

Hypothesis 6: Positive affectivity will moderate the effect of autonomy on investment of self.

PROCESS Analyses Testing the Indirect Effects and Moderated Mediation

To test my proposed model (see [Figure 6](#)) and six hypotheses, I used the PROCESS macro in SPSS to estimate and probe interactions and conditional direct and indirect effects in a moderated mediation model (Hayes, 2013). This analysis progressed in the piecemeal approach recommended by Hayes. First, using a simple mediation model, I assessed the effects of job autonomy on job-based psychological ownership, both directly and indirectly, through experienced control, investment of self, and intimate knowing operating as parallel mediators. Second, using a simple moderation model, I assessed the effect of job autonomy on experienced control as moderated by trait PA. Third, using a simple moderation model, I assessed the effect of job autonomy on investment of self as moderated by PA. Finally, I combined the mediation and moderation models to estimate the conditional indirect effect of job autonomy on job-based psychological ownership through experienced control, investment of self, and intimate knowing as moderated by PA on the *a* paths only (i.e., the paths between autonomy and the three mediators).

For all stages in the PROCESS analysis, I used 10,000 bootstrap samples to create bias-corrected 95% confidence intervals (CI95) for various effects. Bootstrapped confidence intervals essentially show the high-low range where the “true” effect should lie. Therefore, if the CI95 contains zero the effect is not considered to be statistically significant. The bootstrapping approach for statistical inferences is the current ideal because it is higher-powered (and thus able to detect smaller effects) than other approaches and makes no assumptions about the shape of the

sampling distribution (Hayes, 2013). The variables of age, gender, and tenure were included as covariates in all analyses.

Step 1: Parallel mediation analysis. The moderated mediation analysis occurred in a piecemeal fashion. In the first step I tested the central mediation paths from job autonomy to the three routes to psychological ownership. The model and results are presented in [Figure 7](#) and [Table 6](#). Results showed that 49% of the variance in job-based psychological ownership was accounted for by job autonomy, the three routes, and demographics. There was a statistically significant total effect ($B = .517, p < .001$) of job autonomy on psychological ownership. This provides support for Hypothesis 1 that predicted a strong positive relationship between job autonomy and job-based psychological ownership. Results also suggest a statistically significant positive total indirect effect ($B = 0.427, CI95 0.337$ to 0.524) from autonomy to psychological ownership through the three routes of experienced control, investment of self, and intimate knowing. This means that jobs with one unit higher autonomy were, on average, .427 units higher on psychological ownership as the result of autonomy's effect on the three routes to ownership, which in turn effects psychological ownership.

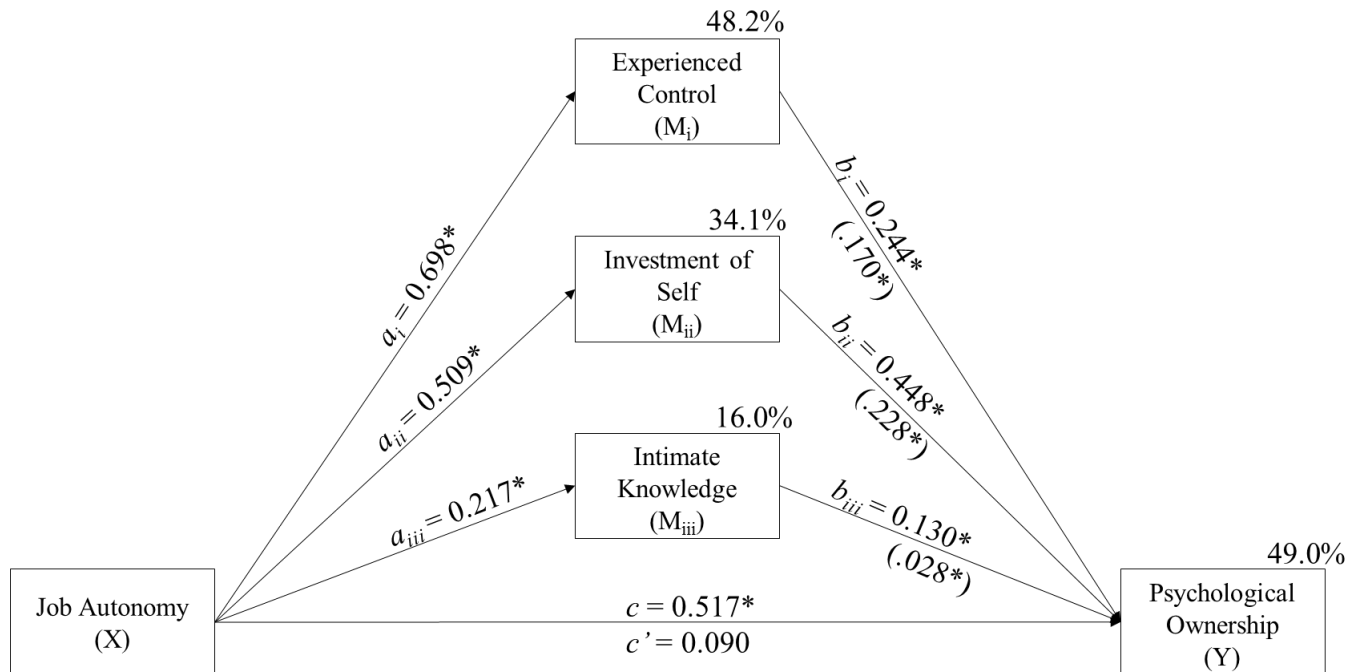


Figure 7. Regression Coefficients and Indirect Effects in Parallel Mediation Model. Control variables include age, gender, and tenure. Percent values indicate amount of variance accounted for by predictor(s). Values in parentheses represent indirect effects. * $p < .05$ or 95CI does not include zero.

All a paths from job autonomy to the three routes were positive and significant, suggesting that job autonomy had a positive relationship with self-reported experienced control ($a_i = 0.698, p < .001$), investment of self ($a_{ii} = 0.509, p < .001$), and intimate knowing ($a_{iii} = 0.217, p < .001$). Likewise, all b paths from the three routes to job-based psychological ownership were positive and significant, suggesting that people who reported greater experience of control ($b_i = 0.244, p < .001$), investment of self ($b_{ii} = 0.448, p < .001$), and intimate knowing ($b_{iii} = 0.130, p = .027$) also reported greater feelings of ownership towards their jobs. The non-significant direct effect of job autonomy on psychological ownership ($c' = 0.090, p = .092, CI_{95} -0.015$ to 0.195) suggests that employees' reported levels of job autonomy have no effect on their feelings of ownership when the mediating variables of experienced control, investment of self, and intimate knowing and their effects are included in the model. This finding provides support for the idea that job characteristics like autonomy have an indirect, or mediated, effect on

psychological ownership by providing employees with the key ownership experiences that in turn give rise to psychological ownership. Regression coefficients and standard errors for model variables and controls are shown in [Table 6](#).

Table 6
Regression Coefficients, Standard Errors, and Model Summary Information for the Job Autonomy Parallel Multiple Mediator Model Depicted in Figure 7

Predictor		Outcome							
		Experienced Control		Investment of Self		Intimate Knowing		Psychological Ownership	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Autonomy	X	0.698**	0.037	0.509**	0.041	0.217**	0.034	0.090+	0.054
Exp Control	<i>M_i</i>	—	—	—	—	—	—	0.244**	0.055
Inv of Self	<i>M_{ii}</i>	—	—	—	—	—	—	0.448**	0.051
Int Knowing	<i>M_{iii}</i>	—	—	—	—	—	—	0.130*	0.059
Constant		0.755**	0.251	2.000**	0.281	4.612**	0.230	0.809*	0.366
Age	<i>C_A</i>	-0.004	0.005	0.014*	0.006	0.007	0.005	-0.002	0.006
Gender	<i>C_B</i>	0.100	0.101	-0.041	0.113	-0.182*	0.092	-0.056	0.105
Tenure	<i>C_C</i>	0.012	0.011	0.033**	0.012	0.025*	0.010	-0.002	0.011
		$R^2 = 0.482$		$R^2 = 0.341$		$R^2 = 0.160$		$R^2 = 0.490$	
		$F(4, 407) = 94.528,$		$F(4, 407) = 52.740,$		$F(4, 407) = 19.411,$		$F(7, 404) = 55.558,$	
		$p < .001$		$p < .001$		$p < .001$		$p < .001$	

Note. ($N = 412$). + $p < .10$, * $p < .05$, ** $p < .01$.

Hypotheses 2 through 4 predicted that the effects of job autonomy on job-based psychological ownership would be mediated by experienced control (*Hypothesis 2*), investment of self (*Hypothesis 3*), and intimate knowing (*Hypothesis 4*). Specific indirect effects along with total and direct effects are presented in [Table 7](#). Specific indirect effects can be interpreted the same way as indirect effects in a simple mediation model, with the addition of controlling for the effects of all other mediators in the model (Hayes, 2013). All three specific indirect effects were positive and significant, providing support for Hypothesis 2 ($B = 0.170$, $SE = 0.039$, CI95 0.083 to 0.260), Hypothesis 3 ($B = 0.228$, $SE = 0.032$, CI95 0.152 to 0.320), and Hypothesis 4 ($B =$

0.028, $SE = 0.014$, CI95 0.000 to 0.068). In other words, employees with high-autonomy jobs reported greater experienced control, investment of self, and intimate knowing, which in turn was associated with greater feelings of psychological ownership towards their jobs.

Pairwise comparisons indicated that the strength of the specific indirect effects through experienced control and investment of self were not statistically significantly different from each other ($B_{CONT} - B_{INV} = -0.058$, CI95 -0.206 to 0.082). However, both were significantly stronger than the specific indirect effect through intimate knowing ($B_{CONT} - B_{KNOW} = 0.142$, CI95 0.049 to 0.236; $B_{INV} - B_{KNOW} = 0.200$, CI95 0.102 to 0.309). This indicates that the strength of the indirect effect of autonomy on ownership varied significantly as a function of route: experienced control and investment of self each accounted for significantly more of the effect of autonomy on ownership than investment of self. In other words, control and investment better transferred autonomy's effects on ownership. Finally, by adding the three indirect effects to the model, the overall amount of variance explained in psychological ownership went from 27.2% (in the total effect model that contains only autonomy and the control variables) to 49.0% (in the final model that contained autonomy, the control variables, and the three indirect effects). Consequently, when it comes to predicting psychological ownership, incorporating the indirect effects almost doubles the strength of prediction.

Table 7

Direct, Indirect, and Total Effects of Job Autonomy (X) on Job-Based Psychological Ownership (Y) through Experienced Control (M_i), Investment of Self (M_{ii}), and Intimate Knowing (M_{iii})

Effect	Indirect Effect			B	SE	p	CI95	
	a path		b path				Lower	Upper
AUT → CONT → OWN	0.698	X	0.244	= 0.170*	.046		0.083	0.260
AUT → INV → OWN	0.509	X	0.448	= 0.228*	.043		0.152	0.320
AUT → KNOW → OWN	0.217	X	0.130	= 0.028*	.017		0.000	0.068
Total indirect effect				0.427*	.048		0.334	0.520
Total effect of X on Y (c)				0.517*	.045	.000	0.428	0.605
Direct effect of X on Y (c')				0.090+	.053	.092	-0.015	0.195

Note. $R^2=0.490$. AUT=job autonomy; CONT=experienced control; INV=investment of self; KNOW=intimate knowing; OWN=job-based psychological ownership; B=unstandardized effect; SE=bootstrapped bias-corrected standard error; Indirect Effect=coefficients used to calculate specific indirect effects; CI95=bootstrapped bias-corrected confidence intervals. 10,000 bootstrapped samples were used. Control variables in this model include age, gender, and tenure. + $p < .10$; * $p < .05$ or 95CI does not include zero.

Step 2: First moderation analysis. In the second step of the piecemeal approach, I assessed the conditional effects on the path from job autonomy to experienced control as a function of the proposed moderator trait PA (*Hypothesis 5*). The other two mediators, experienced control and intimate knowing, were included as covariates in this analysis in order to control and parse out their effects to provide a more accurate picture of the relationships between IV, moderator, and DV. Age, gender, and tenure were also controlled for. The predictor variables autonomy and PA were mean-centered prior to creating product terms. While Hayes (2013) views the practice of mean-centering as inconsequential to the results in moderation analysis, I chose to use this technique for this and the subsequent moderation and conditional indirect effects analysis in order to (a) increase the interpretability of findings and (b) produce estimates that will be more aligned with those obtained from the SEM analysis presented later in this section (Aiken & West, 1991).

Results from the moderation analysis (PA moderating the effect of autonomy on experienced control) are provided in [Table 8](#) and indicate a significant interaction between job

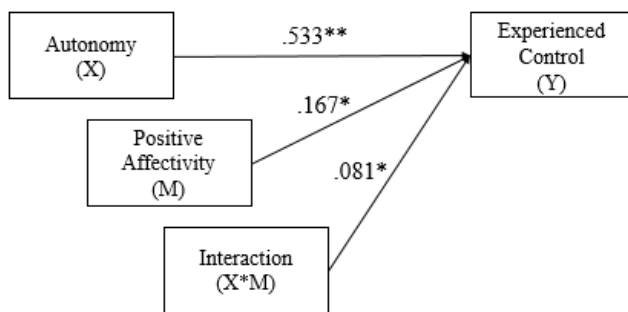
autonomy and PA on experienced control ($B = 0.081, p = .038$). To probe this interaction, I applied the Johnson-Neyman technique (Hayes, 2013). This technique answers the question: at what range of the moderator does the relationship between the IV and DV become statistically significant? The results revealed that autonomy predicted experienced control at all levels of PA*. To further probe the interaction I examined the strength of the effect of autonomy on experienced control at various levels (10th, 25th, 50th, 75th, and 90th percentiles) of employee PA. Results are provided in [Table 8a](#) and suggest that, as employee PA increases the effect of autonomy on experienced control also increases in strength. In other words, as jobs increased in autonomy, high-PA employees reported stronger gains in control compared to low-PA employees.

The direction of this interaction is inconsistent with Hypothesis 5, which predicted a stronger relationship for employees with low PA. Simple slopes are provided in [Figure 8](#) and show that all employees in low-autonomy jobs tended to reported the same lack of control. This ran counter to the prediction that high PA employees would be susceptible to the illusion of control and thus report high levels of experienced control across the range of autonomy (i.e., a high and flat simple slope predicted in [Figure 4](#)). Thus, Hypothesis 5 was not supported.

* Given these results it may be prudent here to take a step back and clarify the differences between a moderated (i.e., interaction) effect and a conditional effect. The interaction above is a perfect example of a situation where moderation was formally supported, yet follow-up probes did not reveal a conditional effect (i.e., autonomy was significantly related to control at all levels of employee PA). This discrepancy is so common that Hayes (2013) addressed it in his book on moderation, mediation, and conditional process analysis (pp. 315-320). According to Hayes it is possible to observe a significant moderation without significant conditional effects and vice-versa, significant conditional effects in the absence of a statistically significant interaction. This is because a moderation is conceptually distinct from a conditional effect. Specifically, Hayes notes that a test of moderation describes whether the relationship between X and Y depends on M, whereas a test of conditional effects describes whether X is significantly related to Y at some value of M (or above/below some value of M derived from the Johnson-Neyman technique). It is entirely possible to support moderation while follow-up probes indicate that X's effect on Y is not conditional on some level of M (i.e., that it is significant at all levels of M), and vice-versa. Ultimately, formal tests of interactions should be relied on to test moderation hypotheses.

Table 8
Results from a Regression Analysis Examining the Moderation of the Effect of Job Autonomy on Experienced Control by Positive Affectivity

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.761**	0.379	7.284	.000
Autonomy (<i>X</i>)	0.533**	0.045	11.717	.000
Positive Affectivity (<i>M</i>)	0.167*	0.071	2.348	.019
Autonomy x Positive Affectivity (<i>X*M</i>)	0.081*	0.039	2.078	.038
Age (<i>C</i> ₁)	-0.010	0.006	-1.656	.099
Gender (<i>C</i> ₂)	0.111	0.093	1.190	.235
Tenure (<i>C</i> ₃)	0.003	0.013	0.218	.827
Investment of Self (<i>C</i> ₄)	0.263**	0.060	4.402	.000
Intimate Knowing (<i>C</i> ₅)	0.053	0.057	0.921	.358



$R^2 = 0.558$
 $F(8, 403) = 76.391, p < .001$

R^2 increase due to interaction = 0.005
 $F(1, 403) = 4.407, p = .036$

Note. ($N = 412$). Mean-centering was used to compute product terms. Control variables include age, gender, tenure, investment of self, and intimate knowing. ** $p < .01$; * $p < .05$.

Table 8a
Conditional Effects of Autonomy on Experienced Control at Various Levels of Positive Affectivity

Positive Affectivity	Effect	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence Interval	
					Lower	Upper
10 th percentile	0.445*	.057	7.869	.000	0.334	0.557
25 th percentile	0.486*	.047	10.278	.000	0.393	0.579
50 th percentile	0.535*	.046	11.717	.000	0.445	0.624
75 th percentile	0.583*	.055	10.600	.000	0.475	0.692
90 th percentile	0.616*	.065	9.423	.000	0.487	0.744

Note. ($N = 412$). Values for moderator are 10th, 25th, 50th, 75th, and 90th percentiles after mean-centering. Effects represent the unstandardized conditional effects of autonomy on control at the specified level of the positive affectivity. Control variables include age, gender, tenure, investment of self, and intimate knowing. * $p < .01$.

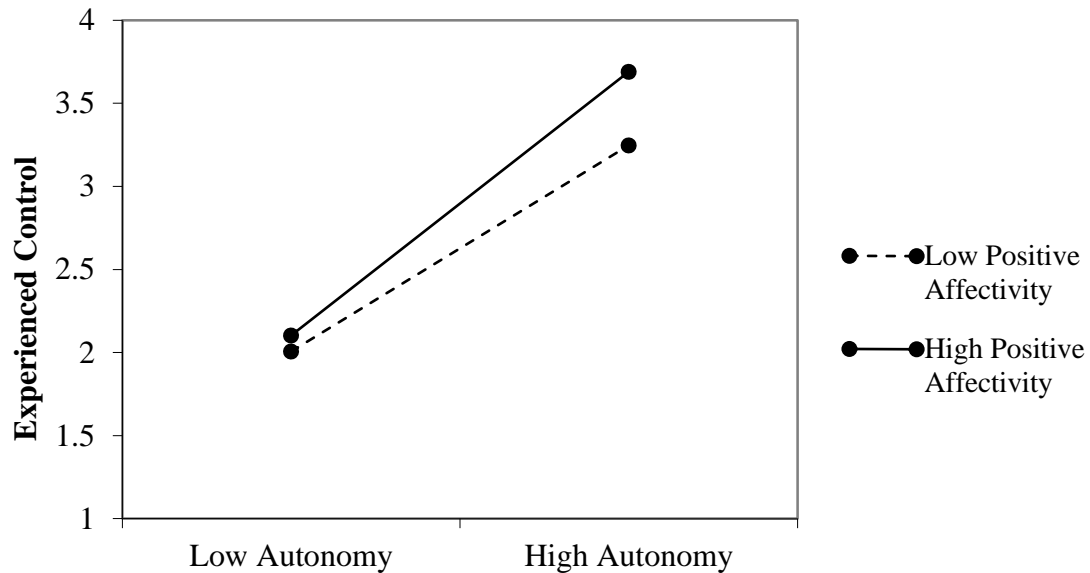


Figure 8. Simple Slopes of the Effects of Autonomy and PA on Experienced Control.

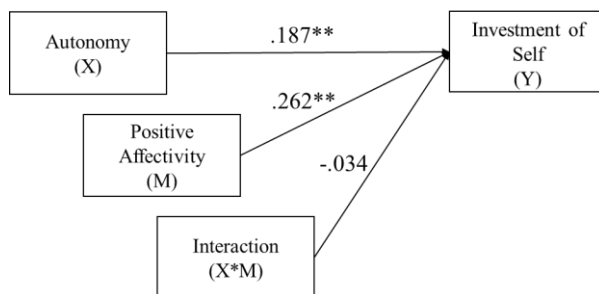
Step 3: Second moderation analysis. In the third step of the piecemeal approach, I assessed the conditional effects on the path from job autonomy to investment of self as a function of the proposed moderator PA (*Hypothesis 6*). As before, age, gender, tenure, experienced control, and intimate knowing were included as covariates. Results are provided in [Table 9](#). The analysis revealed a non-significant interaction effect between job autonomy and PA on investment of self ($B = -0.034, p = .509$). However, probes via the Johnson-Neyman Technique (Hayes, 2013) seemed to suggest that the effect of autonomy on investment of self was conditional on employee PA, such that autonomy did not seem to predict investment for happy, high-PA employees (i.e., the top 19.9% of PA distribution). To further explore the conditional effects, I report the strength of the conditional effects of autonomy on investment at various levels of PA in [Table 9a](#). Results from this table suggest that, as employee levels of PA increase, autonomy has a weaker, and ultimately non-significant, effect on investment of self. It is also

noteworthy that the strength of the effect of autonomy on investment of self is considerably weaker than its effect on experienced control. This is evident when comparing the effect sizes in [Table 8a](#) with those in [Table 9a](#). It seems that this interaction effect was non-significant because the range of the effect sizes from high to low PA was relatively small (i.e., from 0.223 for the top 10th percentile to 0.152 for the bottom 10th percentile).

The simple slopes are provided in [Figure 9](#). Taken together with the results from the Johnson-Neyman analysis, they appear to support the direction of effects predicted by Hypothesis 6 (i.e., that the relationship between autonomy and investment would be weaker for high-PA employees and stronger for low-PA employees as shown in [Figure 5](#)). However, the non-significant interaction effect still indicates that the relationship between autonomy and investment is not significantly moderated by PA. Thus, Hypothesis 6 was ultimately not supported.

Table 9
Results from a Regression Analysis Examining the Moderation of the Effect of Job Autonomy on Investment of Self by Positive Affectivity

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	1.888**	0.527	3.580	.000
Autonomy (<i>X</i>)	0.187**	0.066	2.828	.005
Positive Affectivity (<i>M</i>)	0.262**	0.081	3.230	.001
Autonomy x Positive Affectivity (<i>X*M</i>)	-0.034	0.051	-0.661	.509
Age (<i>C</i> ₁)	0.013*	0.006	2.291	.022
Gender (<i>C</i> ₂)	-0.034	0.106	-0.318	.751
Tenure (<i>C</i> ₃)	0.023*	0.009	2.493	.013
Experienced Control (<i>C</i> ₄)	0.304**	0.066	4.643	.000
Intimate Knowing (<i>C</i> ₅)	0.245**	0.073	3.365	.001



$R^2 = 0.481$
 $F(8, 403) = 37.518, p < .001$

R^2 increase due to interaction = 0.001
 $F(1, 403) = 0.651, p = .420$

Note. ($N = 412$). Mean-centering was used to compute product terms. Control variables include age, gender, tenure, experienced control, and intimate knowing. ** $p < .01$; * $p < .05$.

Table 9a
Conditional Effects of Autonomy on Investment of Self at Various Levels of Positive Affectivity

Positive Affectivity	Effect	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence Interval	
					Lower	Upper
10 th percentile	0.223**	.072	3.111	.002	0.082	0.364
25 th percentile	0.206**	.063	3.250	.001	0.082	0.331
50 th percentile	0.186**	.066	2.804	.005	0.056	0.316
75 th percentile	0.166*	.082	2.033	.043	0.005	0.326
90 th percentile	0.152	.096	1.589	.113	-0.036	0.341

Note. ($N = 412$). Values for moderator are 10th, 25th, 50th, 75th, and 90th percentiles after mean-centering. Effects represent the unstandardized conditional effects of autonomy on investment at the specified level of the positive affectivity. Control variables include age, gender, tenure, experienced control, and intimate knowing. ** $p < .01$; * $p < .05$.

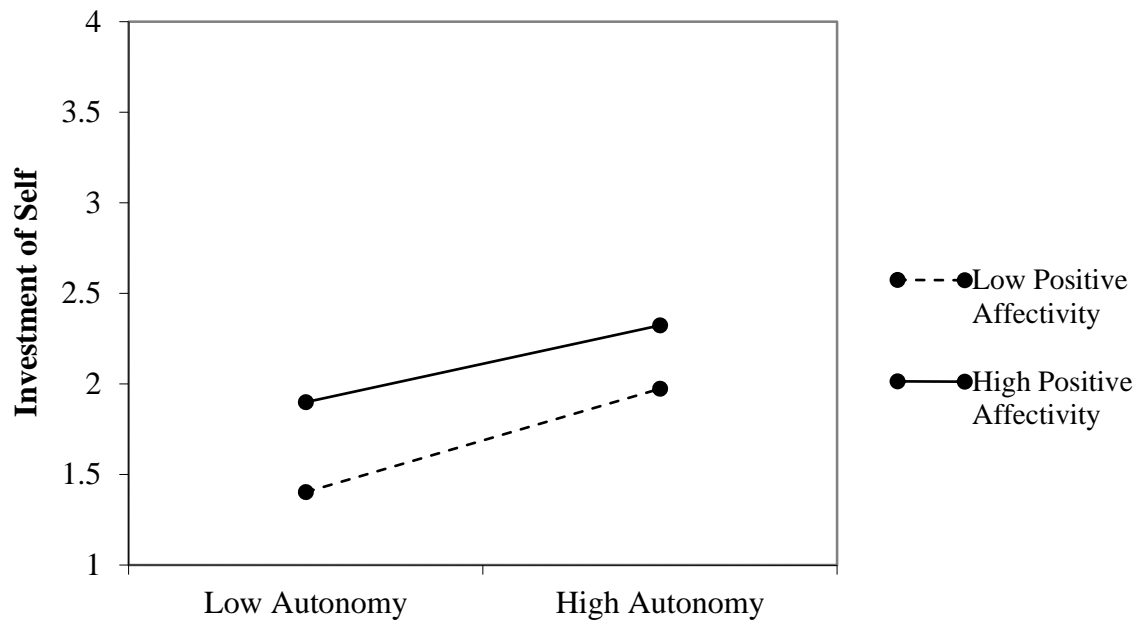


Figure 9. Simple Slopes of the Effects of Autonomy and PA on Investment of Self.

Step 4: Estimating conditional indirect effects. The previous three steps were pieces of the analysis, in that they estimated either mediations *or* moderations. This final step is different in that it combines all of the pieces from the previous analyses into a single, comprehensive model. The conceptual representation of the integrated moderated mediation model is depicted in [Figure 6](#) and was tested using PROCESS model number seven (Hayes, 2013, p. 447). Model coefficients, standard errors, *p* values, and model summary information can be found in [Table 10](#). The model is illustrated in [Figure 10](#), which shows regression coefficients for all paths and the percent of variance accounted for in all predicted variables. As in previous analyses, predictors were centered prior to computing interaction terms and bootstrapping (10,000 samples) was used to create bias-corrected 95% confidence intervals (CI95). The integrated

moderation mediation model reflected the results found in the piecemeal approach that preceded it, and extended them by providing a formal test of moderated mediation. Results from this test comport with Step 2 and indicate that the indirect effect of autonomy on psychological ownership through experienced control was significantly conditional on trait PA (*Index of ModMed* = 0.017, *SE* = 0.011, *CI95* 0.000 to 0.045). This index is essentially the slope of the function of the strength of the indirect effect across values of the moderator (Hayes, 2015). The slopes for all three conditional indirect effects are visualized and discussed later in this section.

Table 10
Regression Coefficients, Standard Errors, and Model Summary Information for the Integrated Conditional Process Model

Predictor		Outcome							
		Experienced Control		Investment of Self		Intimate Knowing		Psychological Ownership	
		<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Autonomy	<i>X</i>	0.652**	0.038	0.421**	0.053	0.145**	0.039	0.090	0.064
Exp Control	<i>M_i</i>	—	—	—	—	—	—	0.244**	0.066
Inv of Self	<i>M_{ii}</i>	—	—	—	—	—	—	0.448**	0.072
Int Knowing	<i>M_{iii}</i>	—	—	—	—	—	—	0.130+	0.078
Positive Affect	<i>W</i>	0.296**	0.068	0.429**	0.080	0.311**	0.059	—	—
Interaction	<i>X*W</i>	0.069+	0.040	-0.031	0.054	-0.076	0.048	—	—
Constant		4.276**	0.193	4.597**	0.207	5.740**	0.181	1.257**	0.466
Age	<i>C_A</i>	-0.006	0.006	0.013*	0.006	0.007	0.005	-0.002	0.006
Gender	<i>C_B</i>	0.087	0.094	-0.053	0.107	-0.188*	0.092	-0.056	0.107
Tenure	<i>C_C</i>	0.013	0.013	0.033**	0.011	0.025*	0.010	-0.002	0.009
		$R^2 = 0.513$		$R^2 = 0.403$		$R^2 = 0.231$		$R^2 = 0.490$	
		$F(6, 405) = 76.828,$		$F(6, 405) = 40.828,$		$F(6, 405) = 17.572,$		$F(7, 404) = 54.099,$	
		$p < .001$		$p < .001$		$p < .001$		$p < .001$	

Note. ($N = 412$). Variables were mean-centered prior to analysis. + $p < .10$, * $p < .05$, ** $p < .01$.

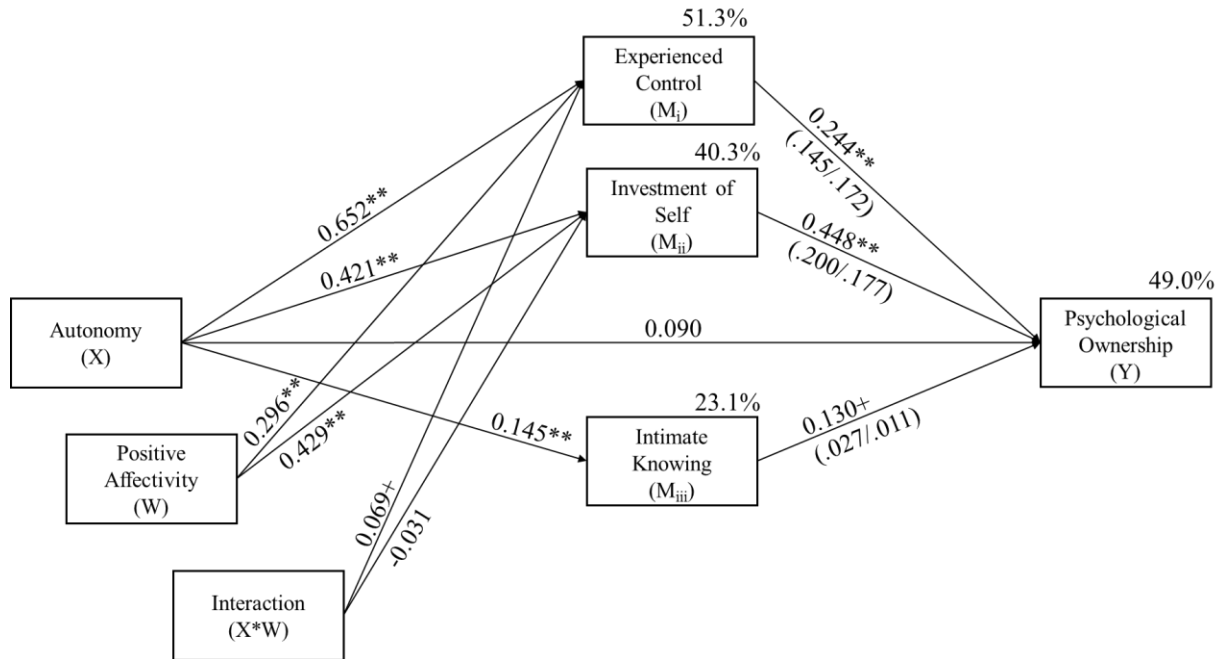


Figure 10. Regression Coefficients and Conditional Indirect Effects for Final Moderated Mediation. Values in parenthesis on the three *b* paths indicate the conditional indirect effects of X on Y at one SD above/below the mean level of W. Percentages above mediators and outcome represent the variance accounted for by predictors in model. Control variables include age, gender, and tenure. + $p < .10$, * $p < .05$, ** $p < .01$.

To follow up on the significant index of moderated mediation, I probed the strength of the proposed conditional indirect effects at the 10th, 25th, 50th, 75th, and 90th percentiles of the moderator. The results from this analysis are provided in [Table 11](#) and comport with the pattern of effects from Steps two and three (e.g., as PA increased, the effects for investment decreased and the effects for control increased).

Table 11

Conditional Indirect Effects of Autonomy on Psychological Ownership Through the Routes of Experienced Control, Investment of Self, and Intimate Knowing at Various Levels of Positive Affectivity

Positive Affectivity	Experienced Control			Investment of Self			Intimate Knowing		
	Indirect Effect	95CI		Indirect Effect	95CI		Indirect Effect	95CI	
		Lower	Upper		Lower	Upper		Lower	Upper
10 th percentile	0.141*	0.067	0.223	0.204*	0.123	0.300	0.030*	0.000	0.076
25 th percentile	0.149*	0.071	0.231	0.197*	0.127	0.281	0.025*	0.000	0.061
50 th percentile	0.159*	0.076	0.245	0.188*	0.124	0.272	0.019*	0.000	0.048
75 th percentile	0.169*	0.081	0.262	0.180*	0.113	0.275	0.013*	0.000	0.041
90 th percentile	0.176*	0.084	0.276	0.174*	0.099	0.280	0.009	-0.003	0.042

Note. 95CI = 95% bootstrapped (10,000 samples) bias-corrected confidence intervals. Indirect effects represent the strength of conditional indirect effects from job autonomy to psychological ownership through the specified mediators, presented at specified levels of the moderator. Indirect effects are calculated by multiplying the unstandardized *a* path and *b* path coefficients. * $p < .05$ or confidence interval does not include zero.

To further explore these findings, I followed recommendations by Hayes (2013) and created a graph ([Figure 11](#)) that visually depicts the information in [Table 11](#) by displaying how the indirect effects through each mediator varied in strength across different levels of the moderator. On this graph, the four lines represent the four different effects of autonomy on ownership. These include the three specific indirect effects through experienced control, investment of self, and intimate knowing (the colored lines) and the direct effect of autonomy on ownership (the black line, which is flat because it is not hypothesized to be conditional on PA). The dashed horizontal line represents a null effect; anything above that line represents a positive effect (i.e., more autonomy is associated with more ownership), and the higher the line the stronger the overall effect. The slopes of the lines show how specific indirect effects change in strength across various levels of the moderator. Therefore, positive slopes suggest that a specific mediating effect is stronger for high-PA employees, whereas downward slopes suggest that the mediating effect is stronger for low-PA employees.

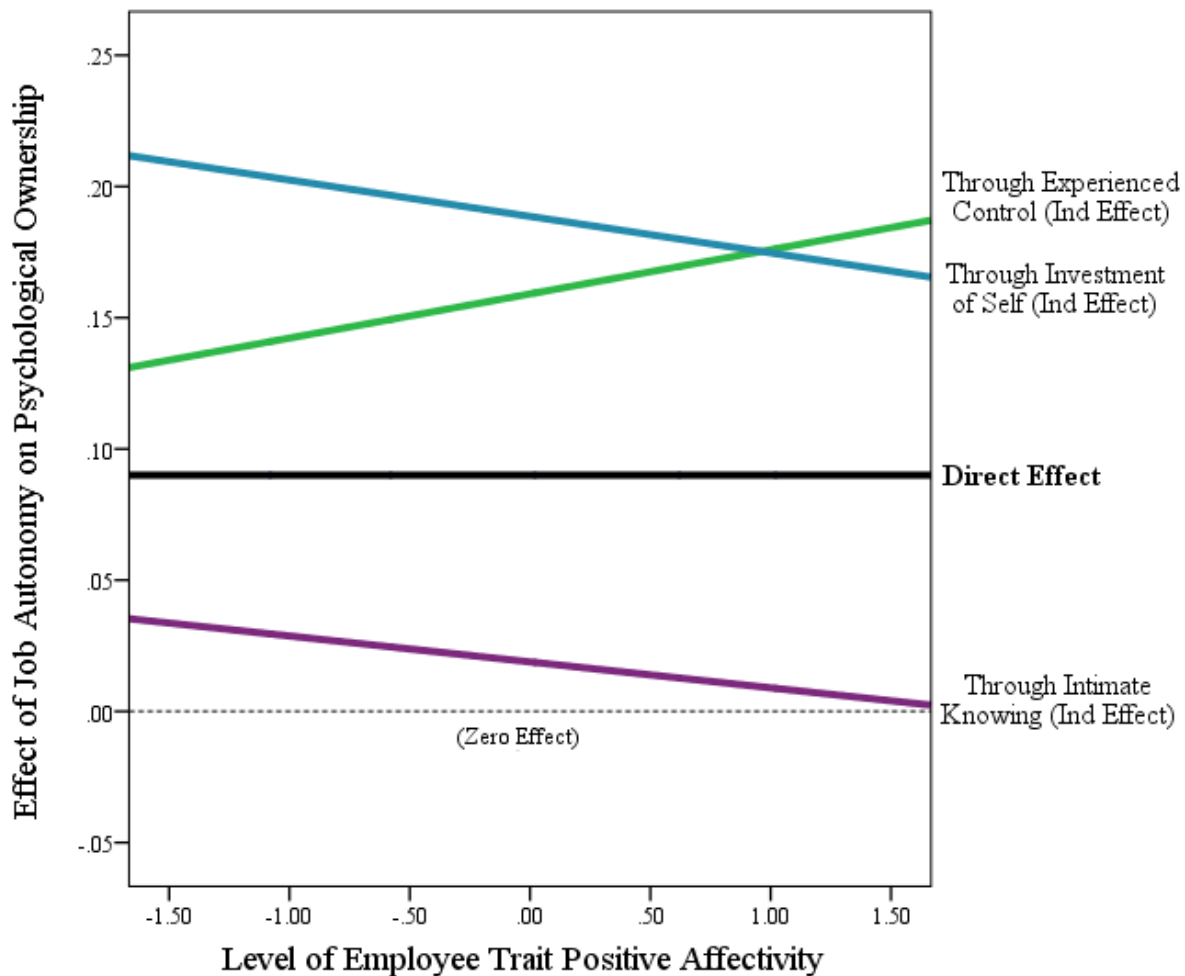


Figure 11. Visual Representation of Direct and Conditional Indirect Effects. This is a representation of the direct and conditional indirect effects of job autonomy on psychological ownership through the three mediators as a function of employee positive affectivity (mean-centered).

For example, looking at the first column of data in [Table 11](#) it is clear that the indirect effect through experienced control becomes stronger as PA increases. This is reflected in [Figure 11](#) by the upward sloping green line (the numbers on the axes also match up with the numbers in [Table 11](#)). This line suggests that, as employee PA increases, autonomy has a stronger effect on ownership through its effect on experienced control (and vice versa a weaker effect for employees with low levels of PA). This result mirrors and extends the previous simple

moderation analysis. It shows a significant moderated mediation, but not in the *direction* that was hypothesized. Therefore, Hypothesis 5 was again unsupported.

The specific indirect effect through investment of self (blue line in [Figure 11](#)) appears to be conditional on employee PA, such that the indirect effect is stronger for low-PA employees and weaker for high-PA employees. This result seems to provide support for Hypothesis 6. However, the formal test of moderated mediation was *not* significant (*Index of ModMed* = -0.014, *SE* = 0.025, CI95 -0.063 to 0.033). This is counterintuitive, given that the slope of the blue line representing the conditional indirect effect (i.e., the moderated mediation) does not appear to be flat in [Figure 11](#). This might be explained by the amount of error associated with the effect, in that there was more than twice as much error in the index of moderated mediation for investment of self, compared to the index for experienced control (*SE* = 0.025 vs. 0.011). In all, Hypothesis 6 was not supported, although given a greater sample size or less error, this effect might be expected to reach significance.

Finally, the specific indirect effect through intimate knowing (purple line in [Figure 11](#)) is relatively weak and flat compared to the other two lines. This suggests that the indirect effect is not conditional on employee PA, which is in-line with the previous prediction that PA would only moderate the *a* paths from autonomy to experienced control and investment of self. Also interesting to note is that the line appears to be hovering just above the zero, or null, effect. This means that the strength of the indirect effect through intimate knowing is relatively weak, which was also supported in the results from Step 1 where pairwise comparisons of indirect effects showed that control and ownership were significantly stronger. The slope of this line is interesting however, in that the indirect effect only appears to be significant for average and low-PA employees. In other words, autonomy does not seem to promote ownership through this

route for happy, high-PA employees (as shown by the right end of the purple line touching null and the data in [Table 11](#)).

Finally, the results in [Figure 11](#) provide insight regarding how psychological ownership develops differently for high vs. low-PA employees. For low-PA employees, autonomy seems to have the strongest impact on ownership through investment ($B = 0.204$), a moderate impact through control ($B = 0.141$), and a small but significant impact through knowing ($B = 0.030$). For high-PA employees, autonomy seems to influence ownership equally through experienced control ($B = 0.176$) and investment ($B = 0.174$), but not at all through intimate knowing ($B = 0.009$). For average-PA employees, autonomy influences ownership through investment ($B = 0.188$), less so through control ($B = 0.159$), and slightly but still significantly through knowing ($B = 0.019$).

Summary of results from PROCESS analysis. As an analytic tool, PROCESS allows researchers to study models as complex as the moderated parallel mediation model in the current study. To test my hypotheses and proposed models, I used the piecemeal approach recommended by Hayes (2013) before estimating the final conditional process model. Results from the piecemeal approach provided support for Hypotheses 1 through 4 (i.e., the main effect of autonomy on psychological ownership, and the three specific indirect effects through the routes to ownership). Unfortunately, Hypothesis 5 and 6 (i.e., the moderation hypotheses) were not supported. However, given the results from Step two and three, PA was still included as a moderator in the final test of the model. Results from the integrated analysis lent support to Hypotheses 1 through 4 and revealed that autonomy's effects are fully mediated. The moderation hypotheses again were not fully supported. Possibly the most interesting findings from the final PROCESS analysis were the conditional indirect effects. Specifically, the indirect

effect of autonomy on ownership through experienced control was stronger for high-PA employees, while the indirect effect of autonomy on ownership through investment of self was stronger for low-PA employees. Finally, the indirect effect of autonomy on ownership through intimate knowing was non-significant for high-PA employees, but significant (although weak) for low-PA employees. Taken together, these results suggest that PA does play an important role in the development of psychological ownership but not in the way that was hypothesized.

SEM Analysis

The preliminary results from the PROCESS analysis have a number of issues and contradictions that warrant deeper analysis. First, the results from the final analysis (i.e., Step 4) supported a significant moderated mediation of indirect effect of autonomy on psychological ownership through experienced control by PA, and a nonsignificant moderated mediation of the indirect effect through investment of self. However, after probing the indirect effects it appeared that *both* indirect effects were at least somewhat conditional on PA (i.e., the indirect effects varied in strength across levels of PA as seen in [Figure 11](#)). Second, a number of the path estimates approached, but did not reach, the $p < .05$ level of significance (or alternatively, their 95CI just barely included zero, as was the case for the Index of ModMed for the indirect effect through investment). Therefore, hypotheses were also tested via SEM in order to obtain greater statistical power and sensitivity to estimate near-significant effects.

In organizational research, SEM has become an increasingly popular approach to analyze data and test hypotheses. It can be thought of as a natural extension of factor analysis and multiple regression (Iacobucci, 2009). By combining these approaches, SEM has the dual strength of integrating a measurement model (e.g., confirmatory factor analysis) with a structural model (e.g., multiple regression) when estimating relationships. This allows SEM to do

something that PROCESS and ordinary least squares (OLS) regression cannot: account for measurement error (Farrell & Rudd, 2009). By accounting for measurement error, SEM provides more precise estimates. Also, by modeling effects while partialing out other effects, results are less biased (Iacobucci, 2008). Given these strengths along with the inconclusive results from the PROCESS analysis, SEM was used to replicate previous tests and conduct exploratory analyses. However, before any analyses could be done missing data had to be imputed.

Because AMOS requires complete (i.e., non-missing) data at the item level to provide modification indices that are necessary to test and refine my measurement model, I first had to impute missing data. Therefore, I conducted multiple imputation in SPSS using the fully conditional specification, or Markov chain Monte Carlo, method (MCMC). I then selected one of the five imputed datasets at random and used that for subsequent SEM analyses.

With complete data for all survey items, I followed Anderson and Gerbing's (1988) recommended two-step approach to SEM. The first step is to use confirmatory factor analysis (CFA) to develop a measurement model that shows acceptable fit to the data. In conducting a CFA, I used a model-generating approach (Jöreskog, 1993) to develop a measurement model that showed adequate fit to the data, then assessed the final measurement model in terms of validity, reliability, and method bias. The steps and results from these analyses are elaborated in the next section entitled *Step 1: Confirmatory factor analysis*. After developing a well-fitting measurement model, the second step is to develop and test a full structural equation model that imposes theoretically derived causal effects. In this second step, I tested all of the hypothesized paths between variables and compared plausible alternative models. Results from this analysis will be elaborated in the section entitled *Step 2: Analysis of the structural model*. Finally, an

exploratory path analysis was conducted in order to follow up on null findings and identify the model for developing job-based psychological ownership that best fits the current data. This is described in the section entitled *Exploratory Path Analysis: PA's Role*. All analyses for both steps were conducted using the maximum-likelihood method in the AMOS 22 program.

Step 1: Confirmatory factor analysis. In order to evaluate the factor structure of my proposed model, I conducted a CFA in AMOS. The purpose of this analysis was to assess the validity and reliability of items and factors, and identify a well-fitting model to test hypotheses. First, I created the measurement model in AMOS that included six latent variables (positive affectivity, autonomy, control, investment, knowing, and psychological ownership) and their respective observed variables, or items. Items were loaded onto their respective dimensions as reflective indicators, such that that causality flowed from latent variable to observed indicator (Byrne, 2010). In order to assess convergent and discriminant validity, the latent variables were allowed to correlate. This measurement model is shown below in [Figure 12](#) as it appeared in AMOS.

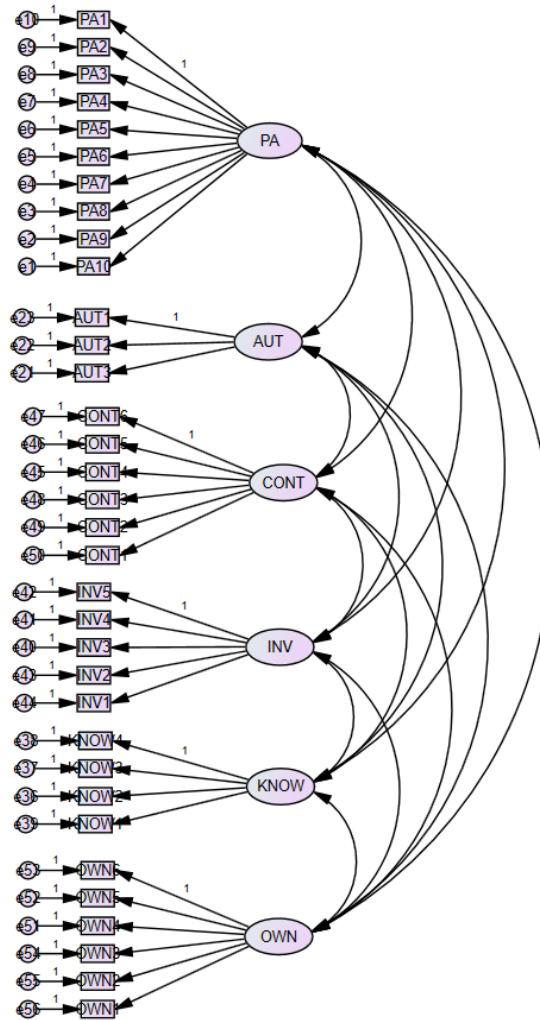


Figure 12. Original Measurement Model as Constructed in AMOS. $\chi^2 (512) = 1638.965$, $p < .001$; $CFI = .905$; $RMSEA = .072$.

Using the model-generating approach (Jöreskog, 1993), next I evaluated the measurement model and revised it as-needed using modification indices (MIs) to identify improvements in model fit. After each improvement, nested models were re-analyzed and compared to the previous model using multiple indicators, including (a) the chi-square difference test, (b) the comparative fit index (CFI; Bentler, 1990), and (c) the root mean square of approximation (RMSEA; Byrne, 2001). Each of these indicators of model fit are described briefly below.

The chi-square likelihood ratio statistic measures the closeness of fit between the sample covariance matrix and the fitted covariance matrix and is used to assess overall fit. The chi-square difference test is also used to assess whether one model shows a statistically significant improvement in fit from another model (Byrne, 2010). However, it is sensitive to sample size such that larger samples result in a higher chance that even small changes will lead to statistically significant differences. Conversely, the CFI is less sensitive to sample size and compares the hypothesized model to the independence model while considering the impact of sample size. The CFI has become a strongly recommended index for evaluating model fit, with values greater than .95 indicating strong fit (Byrne, 2010). The RMSEA has been recently recognized as one of the most informative criteria of model fit (Byrne, 2010). RMSEA is like a “badness of fit index”, in which smaller values indicate better fit. It compares the current model with an optimal version of the model and presents the discrepancy. Therefore, smaller values are better, with values under .06 indicating good fit (Hu & Bentler, 1999).

The analysis of the original measurement model illustrated in [Figure 12](#) and subsequent modifications are presented in [Table 12](#). Of the original model, all observed variables had strong ($\beta = .497$ and higher), positive, and statistically significant regression weights to their respective factors. However, overall model fit was relatively poor ($\chi^2 [512] = 1638.965, p < .001; CFI = .905; RMSEA = .072$). Therefore, I examined MIs (Byrne, 2001) to locate parameters that might be freed to covary. MIs are statistically driven, so re-specifications were only made when substantive rationale supported the parameter change, while error terms were only allowed to covary within their respective factors. Estimates were re-calculated and compared after every specification until fit indices were adequately strong (i.e., $CFI > .95, RMSEA$ close to .05). The specific steps and their results are provided in [Table 12](#), and the final model is illustrated in

[Figure 13](#) and shows an improved fit from the original model ($\chi^2 [504] = 1073.947, p < .001$; $CFI = .952$; $RMSEA = .052$). This model was used to inform all subsequent CFA and SEM analyses.

Table 12
Nesting Table Showing Model Comparisons

Model	MI	χ^2	df	Model comparison	$\Delta\chi^2$	Δdf	Fit1 (CFI)	Fit2 (RMSEA)
M1		1638.965	512				.905	.072
M2 – e2<->e5	118.35	1503.815	511	2 vs. 1	135.15*	1	.916	.068
M3 – e41<->e42	103.67	1379.696	510	3 vs. 2	124.12*	1	.927	.063
M4 – e51<->e53	56.41	1318.741	509	4 vs. 3	60.96*	1	.932	.061
M5 – e48<->e50	51.78	1261.089	508	5 vs. 4	57.65*	1	.936	.059
M6 – e51<->e52	41.64	1212.915	507	6 vs. 5	48.17*	1	.940	.057
M7 – e45<->e46	36.94	1173.474	506	7 vs. 6	39.44*	1	.944	.056
M8 – e52<->e53	46.28	1106.236	505	8 vs. 7	67.24*	1	.949	.053
M9 – e7<->e9	28.83	1073.947	504	9 vs. 8	32.29*	1	.952	.052

* $p < .05$.

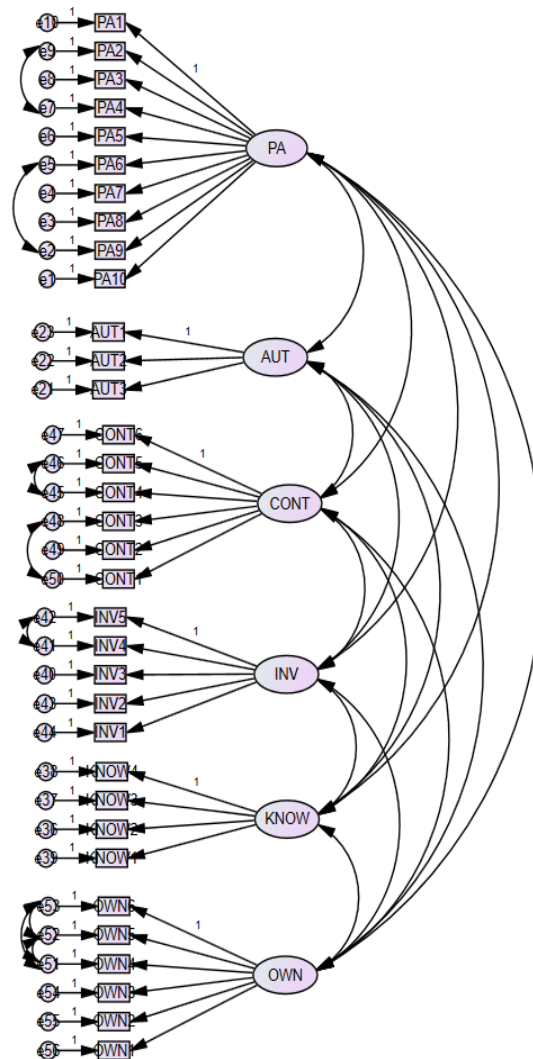


Figure 13. Final Measurement Model. χ^2 (504) = 1073.947, $p < .001$; $CFI = .952$; $RMSEA = .052$.

Convergent validity. Before testing a structural model (e.g., moderated mediation) it is important that researchers find evidence of convergent and discriminant validity of their measurement model (Anderson & Gerbing, 1988). With the final measurement model prepared, I assessed convergent validity using three indicators: (a) factor loadings, (b) average variance extracted (AVE), and (c) composite reliability (Fornell & Larcker, 1981). Establishing

convergent validity in CFA requires several steps. First, each observed variable (i.e., scale item) should converge, or load, onto their respective latent variables (a). This is tested by evaluating the strength and significance of factor loadings, or the regression weights from factor to item (Gefen, Straub, & Boudreau, 2000). Second, the latent variables themselves should account for a majority of the variance between observed variables, which can be assessed using AVE (b). In essence, AVE represents the amount of variance that a latent variable can account for among the items that are theoretically related to it. When the AVE of a latent variable is greater than .50, that means that it accounts for a majority (i.e., > 50%) of the variance of its items (Hair, Black, Babin, & Anderson, 2010; Fornell & Larcker, 1981). Finally, composite reliability (CR) is used to estimate the factor's internal consistency (c). CR is similar to Cronbach's Alpha but it is thought to be an improved internal consistency estimate because it accounts for error variance (Bentler, 2009). CR is the squared correlation between a latent variable and a composite of all of its observed variables, with values above .70 indicating strong reliability (Hair et al.).

Factor loadings, AVE, and CR were calculated for the final measurement model. Factor loadings are presented in [Table 13](#), and AVE and CR can be seen in [Table 14](#). Results provided strong support for the convergent validity of the proposed measurement model. Specifically, all regression weights were significant, AVE for each factor was above .50, and CR values for each factor were well above the .70 cutoff. Psychological ownership displayed the highest convergent validity in that it was associated with the highest CR (0.946) and AVE (0.745). Trait PA showed the lowest AVE (0.501), which is consistent with the fact that PA also had the lowest loadings on average ($\beta = 0.707$). However, since all loadings were positive and significant, no items were dropped from PA.

Table 13
Measurement Model Factor Loadings

Variable and indicators	<i>B</i>	<i>SE</i>	<i>C.R.</i>	β
Positive Affectivity				
PA1	1.000			0.781
PA2	1.062	0.073	14.474	0.681
PA3	1.200	0.076	15.796	0.729
PA4	1.328	0.073	18.177	0.819
PA5	1.335	0.078	17.062	0.777
PA6	0.716	0.073	9.872	0.481
PA7	1.390	0.077	18.079	0.814
PA8	1.067	0.071	14.936	0.695
PA9	0.810	0.065	12.522	0.597
PA10	1.038	0.078	13.393	0.633
Job Autonomy				
AUT1	1.000			0.799
AUT2	0.936	0.055	17.076	0.770
AUT3	1.166	0.057	20.287	0.904
Experienced Control				
CONT1	0.837	0.036	23.258	0.805
CONT2	0.891	0.038	23.346	0.805
CONT3	0.881	0.040	22.046	0.785
CONT4	0.976	0.047	20.640	0.758
CONT5	1.016	0.043	23.579	0.810
CONT6	1.000			0.933
Investment of Self				
INV1	1.035	0.048	21.775	0.857
INV2	1.135	0.052	21.785	0.857
INV3	1.055	0.048	21.889	0.860
INV4	0.857	0.037	22.887	0.692
INV5	1.000			0.838
Intimate Knowing				
KNOW1	1.181	0.061	19.289	0.805
KNOW2	1.215	0.055	22.136	0.885
KNOW3	1.176	0.053	22.117	0.885
KNOW4	1.000			0.826
Psychological Ownership				
OWN1	1.177	0.055	21.251	0.924
OWN2	1.217	0.055	21.959	0.949
OWN3	1.252	0.059	21.353	0.927
OWN4	1.029	0.042	24.695	0.833
OWN5	0.961	0.044	21.717	0.763
OWN6	1.000			0.762

Note. ($N = 426$). *B*=unstandardized regression weights; *SE*=standard error; *C.R.*=critical ratio; β =standardized regression weights. All standardized regression weights are statistically significant at $p < .001$.

Discriminant validity. Discriminant validity is defined as the extent to which a latent variable accounts for more variance in its respective observed variables (i.e., its items) than both measurement error and other variables in the model (Fornell & Larcker, 1981). In the current study, establishing discriminant validity is particularly important for two reasons. First, because of the cross-sectional nature of this study it is essential to provide evidence that the constructs are statistically distinct. Second, because there is some theoretical and conceptual overlap between the constructs of job autonomy (IV) and experienced control (mediator) and high inter-correlations between the two latent variables ($r = .787$), discriminant validity will be important to strengthen confidence in the findings (Farrell & Rudd, 2009).

Several indicators were used to assess discriminant validity in the final measurement model, including maximum shared squared variance (MSV), average shared squared variance (ASV), and square root of AVE. Specifically, discriminant validity is supported for a latent variable when that variable accounts for more variance in its own items than it shares with any other construct (Hair et al., 2010). In other words, AVE should be higher than the amount of variance that a latent variable shares with items from different factors. MSV and ASV are used to explain the maximum amount of variance between a latent variable and items from a different variable (MSV), and the average amount of variance that a latent variable shares with items from other factors (ASV). Therefore, AVE must be greater than both MSV and ASV to support discriminant validity (Hair et al.). Finally, the square root of AVE is also helpful for ensuring that any two constructs are adequately discriminant. Because AVE represents a percent of variance, the square root is similar to the average correlation between a latent variable and its items. By calculating this and comparing it to the correlations between latent variables,

researchers can determine whether a variable shows a stronger relationship to its own items or with items from another construct (Gefen et al., 2000).

Variance estimates and construct inter-correlations are presented in [Table 14](#). Results show strong discriminant validity, in that all constructs displayed greater ASV than MSV and ASV with other constructs. Likewise, the square root of each factor's AVE (shown in bold on the diagonals in [Table 14](#)) are all greater than the correlations between that factor and any other factor. Regarding the discriminant validity between autonomy and experienced control, their correlation (0.619) did not exceed the square root of AVE for both constructs (0.826 and 0.818, respectively). This means that they display adequate discriminant validity and should be treated as separate, distinct constructs.

Table 14
Reliability, Discriminant Validity Indices, and Construct Intercorrelations

Latent Variable	CR	AVE	MSV	ASV	Latent Variable						
					PA	AUT	CONT	INV	KNOW	OWN	
Positive Affectivity	0.908	0.501	0.226	0.175	0.708						
Autonomy	0.865	0.683	0.619	0.314	0.379	0.826					
Experienced Control	0.923	0.669	0.619	0.339	0.426	0.787	0.818				
Investment of Self	0.913	0.678	0.475	0.339	0.475	0.614	0.628	0.823			
Intimate Knowing	0.913	0.724	0.226	0.161	0.387	0.360	0.353	0.475	0.851		
Psych Ownership	0.946	0.745	0.475	0.299	0.417	0.546	0.612	0.689	0.417	0.863	

Note. CR=composite reliability; AVE=average variance extracted; MSV=maximum shared squared variance; ASV=average shared squared variance; PA=positive affectivity; AUT=job autonomy, CONT=experienced control; INV=investment of self; KNOW=intimate knowing; OWN=job-based psychological ownership. Bold values on the diagonal indicate the square root of AVE for that dimension.

Summary of CFA results. In summary, the final measurement model showed strong fit, excellent reliability, strong convergent and discriminant validity, and was relatively free from method effects with the exception of the PA dimension. With satisfactory results from the CFA confirming a sound measurement model, the next step will be to test the structural model, or the model that specifies all of the theorized paths among variables (Byrne, 2010; Anderson &

Gerbing, 1988). However, one more step was required before testing the structural model: creating a latent variable interaction term to test the moderating effects of PA.

Latent variable interaction. The moderation analyses conducted using PROCESS led to mixed support for Hypotheses 5 and 6. Given that the results of these analyses revealed small effect sizes that were either barely significant (i.e., the moderation of autonomy on control by PA) or barely nonsignificant (i.e., the moderation of autonomy on investment by PA), it was prudent to test both moderation hypotheses using SEM. This is in large part due to its increased sensitivity to finding small effects and its ability to account for measurement error (Farrell & Rudd, 2009).

Testing interaction effects using SEM is not a simple matter. There are many different methods to choose from and a number of unresolved issues (Williams, Vandenberg, & Edwards, 2009). This is particularly the case for moderators that are continuous and latent, as is the case with the moderator (PA) in the current study. These issues, along with a step-by-step description of the methods and justifications used to create the latent interaction term, are described in detail for reference in [Appendix B](#).

To summarize, I combined the approaches put forth by Kenny and Judd (1984), Little, Bovaird, and Widaman (2006), and Marsh, Wen, and Hau (2004) to create a completely orthogonal latent variable to assess the interaction effect. This term was created using matched pair product terms using residuals from the IV (autonomy) and moderator (PA). This approach had the strength of allowing the main effects to remain completely unchanged after adding the interaction term, which allowed me to not only estimate the paths from the interaction term to the two mediators (experienced control and investment of self), but also to assess overall improvement in model fit with and without the moderating effects (Little et al., 2006).

Step 2: Analysis of the structural model. With all variables in place, I specified the complete latent structural regression model. This model replicated all of the hypotheses specified and tested in the final model illustrated in [Figure 6](#). By using an SEM approach, this analysis provides some advantages over other methods like OLS regression. These include assessing and correcting for measurement error, providing estimates of overall model fit, and simultaneously modeling the relationships between items to their factors and between the factors themselves (Byrne, 2010; Farrell & Rudd, 2009).

Features of the structural model. The final structural model is presented as it appeared in AMOS in [Figure 14](#). Several features in this model are worth mentioning. Starting on the left side of the model (i.e., the IV and interaction effect) and working to the right (i.e., the outcome), the first thing to notice is the correlation between autonomy (AUT) and PA, referenced by the curved two-sided arrow connecting the two constructs. The reason that autonomy and PA were allowed to correlate in this model is because we would expect perceptions of job autonomy and individual levels of PA to be related in real life. Many studies have shown moderate correlations between autonomy and PA (Agho, Price, & Mueller, 1992; Huelsman et al., 2003). At the same time, autonomy and PA were not allowed to correlate with the interaction term (AUTxPA). The reason for this is simple – by using residual centering to create an orthogonal interaction term, I removed all of the information from the original variables of autonomy and PA. The result is an interaction term that is completely uncorrelated with its base indicators, hence the absence of a correlation connecting them (Little et al., 2006).

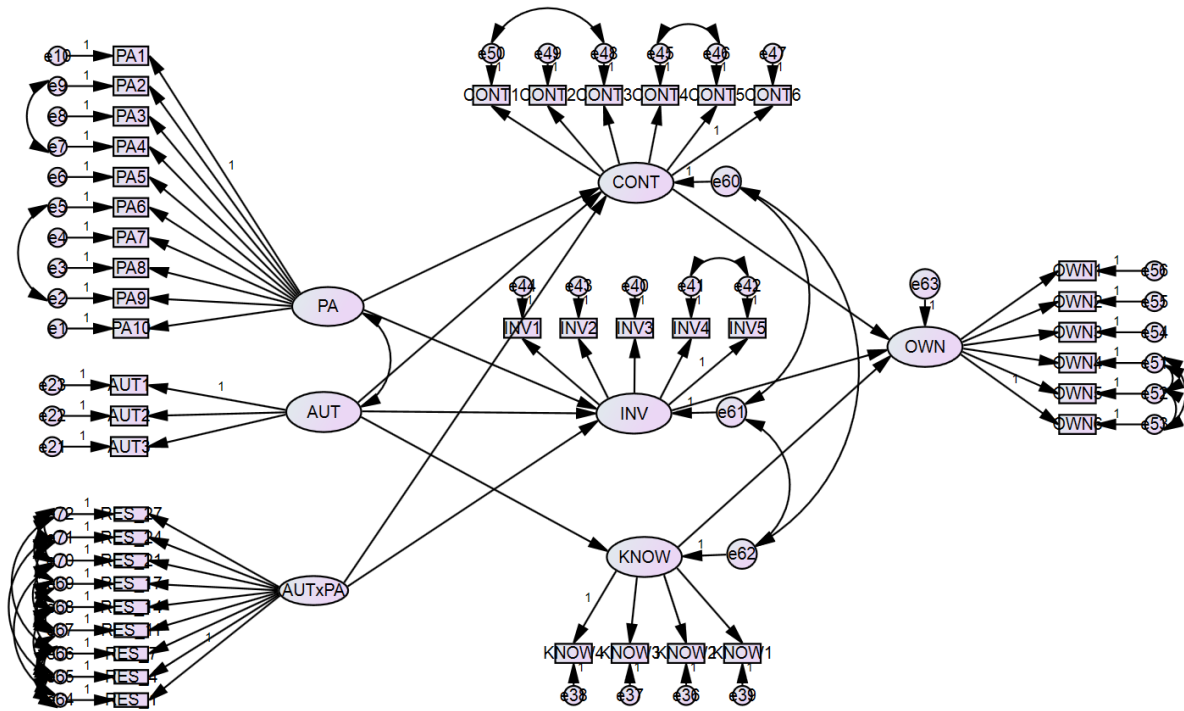


Figure 14. Structural Equation Model as Constructed in AMOS.

Moving onward, the arrows connecting the IV and interaction term to the three mediators of experienced control (CONT), investment of self (INV), and intimate knowing (KNOW) were selected based on my original hypotheses. Specifically, that autonomy would display positive and significant relationships with each of the three mediators (*Hypotheses 2 – 4*), and that PA would moderate the effect of autonomy on control (*Hypothesis 5*) and investment (*Hypothesis 6*). Hence, I added one-sided arrows (representing regression paths) between autonomy with the three mediators, and between PA and AUTxPA with two mediators. PA was also left in the model in order to assess and control for its main effects on control and investment.

In specifying the relationships between the three mediators, I allowed them to correlate by adding curved two-headed arrows that connected each mediator to the other two through their residuals (i.e., error terms). This is called disturbance correlation, and they are used when the

researcher assumes that the connected outcome variables share at least one common cause that is not included in the model (Kline, 2011). I am justified to use them in the current model because there are several omitted variables that have been theorized to influence all three routes (control, investment, and knowing). For example, Pierce et al. (2009) specified that all five job characteristics are likely to result in the three routes to ownership (the hypothesized model only includes one of those five). Brown et al. (2014) also found that another variable, job complexity, significantly predicted all three routes. Because the residuals are essentially “left-over” variance, so by adding the correlations I am not only specifying that the mediators should have omitted shared causes, I am also asking AMOS to calculate the correlations between each of the mediators after accounting for the specified effects.

The right, or outcome, side of the model is fairly self-explanatory. Job-based psychological ownership (OWN) is the outcome and is specified as the direct result of the three mediators. By excluding a path from autonomy to ownership the model implies a full mediation, which is supported by the results from PROCESS. Originally, I had included covariates (e.g., tenure) in the model that would control for the effects of demographic variables on any endogenous variable (CONT, INV, KNOW, and OWN). However, adding age, gender, and tenure into the model had the effect of reducing overall fit. Likewise, a cursory examination of the factor score weights (i.e., regression estimates between observed variables and latent constructs) revealed non-substantive effects, such that all regression weights connecting the control variables to latent constructs were $B = .021$ or weaker (i.e., when the control goes up by 1, the predicted value for the associated latent variable would go up by .021 units). Therefore, I decided to remove control variables from SEM analyses.

Thus, the final model shown in [Figure 14](#) is based on a valid and reliable measurement model and is theoretically sound. However, it is also complex, given that all of the item-factor relationships are shown. To simplify the model and aid in the interpretability of findings, path estimates and results will be displayed on a simplified version of that model that includes only the latent variables (i.e., the ovals) and regression paths (i.e., one-way arrows).

Structural model results: Main effects. The structural model shown in [Figure 14](#) reflects all hypotheses regarding the mediated effect of autonomy on ownership through the three routes and the moderation of autonomy's effect on experienced control and investment of self. Assessing this model in AMOS using maximum likelihood estimation resulted in strong fit ($\chi^2 [820] = 1396.677, p < .001; CFI=.962; RMSEA=.041$). The reported fit indices exceeded benchmarks of $CFI > .95$ and $RMSEA < .06$ for strong fit (Hu & Bentler, 1999). Examining Hoelter's (1983) Critical N (CN) results provides a test of the sample size that would be required to have an adequately powered sample size to detect proposed effects at various p values. Results were also positive here ($CN [.05] = 271; CN [.01] = 280$), suggesting that my sample size ($N = 426$) was more than satisfactory. Likewise, the predictors in the model accounted for 53.1% of the variance in psychological ownership. In essence, all of this means that the hypothesized structural showed a strong fit to the data – both in general and after taking sample size and model complexity into account. However, global fit indices alone are not enough to judge a hypothesized model: one must also look at the strength and significance of the individual paths along with evidence of model misspecification (Byrne, 2010).

Regarding individual path estimates (i.e., regression weights), results are provided in [Table 15](#) and [Figure 15](#), and are summarized here. Autonomy displayed positive relationships with experienced control ($B = 0.838, p = .000$), investment of self ($B = 0.546, p = .000$), and

intimate knowing ($B = 0.251, p = .000$). These variables, in turn, had significant and positive relationships with psychological ownership ($B = 0.255, 0.461, 0.142, p = .000, .000, .025$, respectively). The only paths in the model that were not significant were the two paths leading from the interaction effect to experienced control ($B = 0.064, p = .294$) and investment of self ($B = 0.034, p = .583$). This result does not support Hypotheses 5 and 6: confirming evidence would have resulted in negative and significant path estimates.

Also worth noting is the small and non-significant direct effect from autonomy to psychological ownership ($B = 0.001, p = .986$), which suggests that autonomy has no impact on psychological ownership after controlling for the three indirect effects. However, in order to test specific indirect effects in AMOS an additional step was required to incorporate phantom variables.

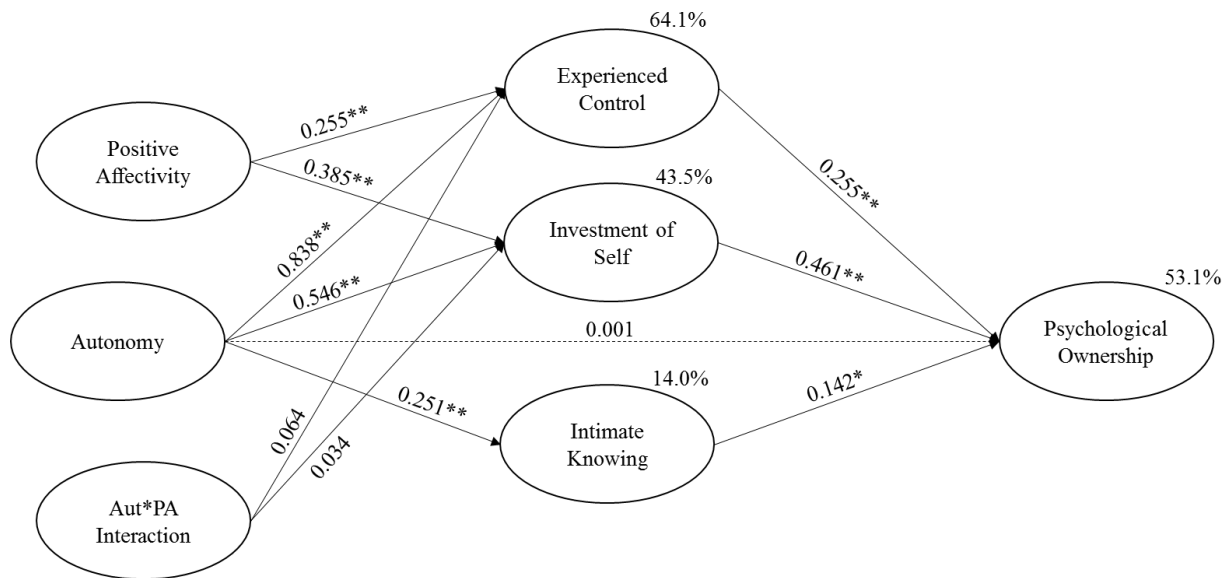


Figure 15. Structural Model Regression Coefficients. Values on paths are unstandardized regression weights (B). Percent values above endogenous variables represent the proportion of variances accounted for by predictors. Dashed line shows the direct effect of autonomy on psychological ownership. ** $p < .01$; * $p < .05$.

Table 15
Path Estimates, SEs, and P-values from the Hypothesized Structural Model

Path			<i>B</i>	β	<i>SE</i>	<i>p</i>
Autonomy	→	Control	0.838**	0.739	0.057	.000
Autonomy	→	Investment	0.546**	0.540	0.054	.000
Autonomy	→	Knowing	0.251**	0.374	0.036	.000
Control	→	Ownership	0.255**	0.288	0.046	.000
Investment	→	Ownership	0.461**	0.464	0.058	.000
Knowing	→	Ownership	0.142*	0.095	0.063	.025
Autonomy	→	Ownership ^a	0.001	0.001	0.075	.986
AUT*PA	→	Control	0.064	0.040	0.061	.294
AUT*PA	→	Investment	0.034	0.024	0.062	.583
PA	→	Control	0.255**	0.130	0.079	.001
PA	→	Investment	0.385**	0.221	0.081	.000

Note. AUT*PA=latent variable interaction effect; PA=positive affectivity. ^a Direct effect from AUT→OWN was calculated in a separate model (identical to Figure 15 with the addition of one path added from AUT to OWN) so as not to skew main model results. ** $p < .01$; * $p < .05$.

Structural model results: Specific indirect effects. While the analysis above provided evidence of the relationships between specific variables, it was lacking because it could not tell the story of *how* autonomy promotes ownership through specific pathways. Therefore, in order to test Hypotheses 2, 3, and 4 (which stated that experienced control, investment of self, and intimate knowing would mediate the effects of autonomy on ownership) an additional step was required. To assess the significance of each indirect effect I followed recommendations from Macho and Ledermann (2011) to create phantom variables (shown in [Figure 16](#)). This technique essentially “tricks” AMOS into providing bootstrapped estimates and standard errors for specific indirect effects while leaving the main parameter estimates unchanged. Bootstrapping (1,000) was used to calculate bias-corrected estimates for standard errors (SE), confidence intervals (90CI), and *p*-values.

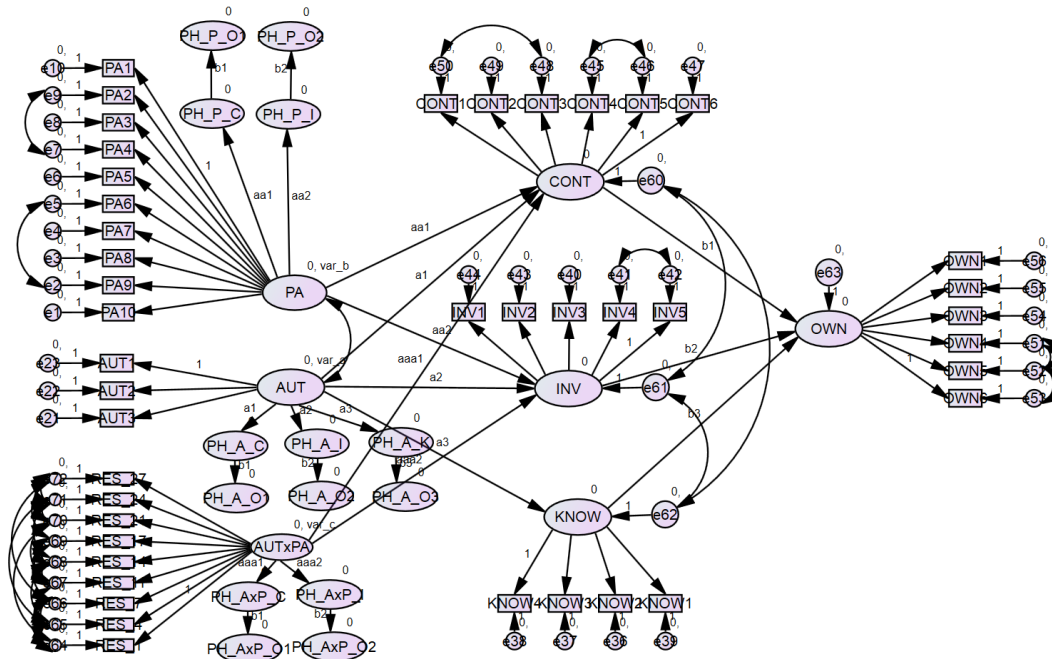


Figure 16. Phantom Model. By incorporating the phantom variables above autonomy, PA, and the interaction term, this model “tricks” AMOS into testing the specific indirect effects.

Results from this analysis are provided in [Table 16](#) and supported all three mediation hypotheses. The specific indirect effect of autonomy to ownership through investment of self (*Hypothesis 3*) was the strongest ($B = 0.252$, CI90 0.178 to 0.349). Experienced control (*Hypothesis 2*) displayed a significant indirect effect ($B = 0.214$, CI90 0.137 to 0.293). Finally, intimate knowing (*Hypothesis 4*) also significantly mediated the effects of autonomy on ownership ($B = 0.036$, CI90 0.003 to 0.082). This result provides the most conclusive support for Hypotheses 2 – 4 by providing evidence that, when controlling for the effects of the other two moderators and employee PA, the indirect effect of job autonomy on psychological ownership through each of the three routes was positive and statistically significant. These findings comport with the results from PROCESS in that investment was the strongest indirect effect while knowing was the weakest.

Table 16

Bias-Corrected Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects using Phantom Variables

Effect	<i>a</i> path	<i>b</i> path	Mean effect		<i>p</i> ^b	90CI ^a	
			(<i>B</i>) ^a	<i>SE</i> ^a		Lower	Upper
AUT → CONT → OWN	0.838	X 0.255	= 0.214**	0.049	.002	0.137	0.293
AUT → INV → OWN	0.546	X 0.461	= 0.252**	0.053	.001	0.178	0.349
AUT → KNOW → OWN	0.251	X 0.142	= 0.036*	0.023	.078	0.003	0.082
Total indirect effect of AUT on OWN			0.501**	0.053	.002	0.415	0.594
Total indirect effect of PA on OWN ^c			0.243**	0.065	.002	0.136	0.359
Total indirect effect of AUT*PA on OWN ^c			0.032	0.046	.397	-0.035	0.119

Note. AUT=autonomy; CONT=experienced control; INV=investment of self; KNOW=intimate knowing; OWN=psychological ownership. ^a bootstrapped (1,000) bias-corrected estimates; ^b two-tailed significance (also bootstrapped bias-corrected); ^c total indirect effects of PA and AUT*PA include only the two specific indirect effects through experienced control and investment of self – they do not include intimate knowing to remain consistent with original hypotheses. ** $p < .01$; * $p < .05$ or confidence interval does not include zero.

Structural model results: Moderation effects. Hypothesis 5 and 6 stated that PA would moderate the effect of autonomy on experienced control and investment of self (respectively). By creating an orthogonal latent variable interaction term and loading it onto experienced control and investment of self, I was able to assess both (a) the significance of specific interaction effects, and (b) the change in overall model fit with and without the interaction effects. Regarding the specific interaction effects, results did not support moderation. Illustrated in [Table 15](#), the paths between the interaction term to experienced control ($B = 0.064$, $p = .294$) and intimate knowing ($B = 0.034$, $p = .583$) were both nonsignificant. Thus, Hypotheses 5 and 6 were not supported. This comports with the PROCESS analysis in that neither hypothesis was supported, yet it contradicts the significant moderation of autonomy on control by PA found in PROCESS Step 2.

Given that all the paths leading from the interaction term are not statistically significant, it would be reasonable to modify the model by trimming the paths and removing the latent interaction variable itself (Byrne, 2010). [Table 17](#) shows overall model fit indices for the original hypothesized model with the interaction effect, and the same model without the interaction effect (i.e., after deleting the latent variable, its respective items, and paths). Comparing the two models paints a somewhat confusing picture. Compared to the model *without* an interaction effect, the model with the interaction effect (i.e., [Figure 14](#)) has stronger fit according to CFI, PCFI, and RMSEA. However, adding the interaction effect resulted in large increases in chi-squared and AIC, which suggest poorer fit. Therefore, according to some fit indices (CFI, PCFI, and RMSEA) the model that includes the interaction effect has a stronger fit to the data, while according to other fit indices (chi-squared and AIC) the model without the interaction effect has stronger fit. Both models seem to explain the same amount of variance in psychological ownership. This result leads us with the question: *What role, if any, does PA play in the development of job-based psychological ownership through the three routes?*

Table 17
Comparing Fit With and Without the Interaction Effect

Model	χ^2	df	R ²	CFI	PCFI	AIC	RMSEA (CI90)
With Interaction Effect	1396.677	820	.531	.962	.874	1734.677	.041 (.037/.044)
Without Interaction Effect	1104.442	507	.531	.950	.858	1280.442	.053 (.048/.057)

Note. R²=squared multiple correlation for psychological ownership; CFI=comparative fit index; PCFI=parsimonious comparative fit index; RMSEA=root mean square of approximation; CI90=90% confidence interval around RMSEA. Model with interaction effect is illustrated in Figure 14.

Summary of results from SEM analyses. In order to conduct more fine-grained tests of my hypotheses and assess the psychometric properties of the instruments and methods utilized in the current study (particularly important given the cross-sectional nature of the study), I conducted an additional set of analyses in AMOS. These analyses were largely guided by

Anderson and Gerbing's (1988) two-step approach to SEM that starts out by assessing the validity and reliability of the items and factors (CFA) then moving on to estimate relationships between variables (SEM). In the first stage I conducted a CFA to identify a well-fitting measurement model. This model ([Figure 13](#)) had a strong fit to the data. Convergent validity was supported, as each of the items loaded significantly onto their latent variables while the variables themselves captured a majority of the variance of their respective items. Discriminant validity was supported, as no variables significantly overlapped with other variables, nor were better explained by other variables than their own items. Reliability was supported, as each variable showed strong internal consistency. Overall method bias was below the threshold of concern, and method effects were largely limited to a single variable (PA).

In the second stage, I specified causal paths between variables based on my hypotheses to create a structural model. This model ([Figure 14](#)) showed strong fit, suggesting that the hypothesized links adequately described what was happening in the data. However, a closer look revealed that parts of the model were stronger than others. All of the hypotheses describing main and mediated effects were supported (*Hypotheses 1-4*), but the hypotheses describing moderated effects were not supported (*Hypotheses 5 and 6*). Thus, the second stage of this analysis concludes with support for only the first four hypotheses.

SEM vs. PROCESS Results

Ultimately, SEM allows for a more refined test of the hypotheses by allowing me to test and compare moderation and mediation paths while also accounting for measurement error. Comparing these results to those from the PROCESS analysis, there were some similarities and key differences worth noting. Regarding the moderation effect, the SEM results were similar because the strength of the effect was stronger on experienced control than investment of self,

but different because no moderation effects were statistically significant. The path estimates were roughly similar, with the exception that the path from the interaction effect to investment of self was positive in the SEM and negative in the PROCESS analysis. The SEM analysis also seemed to result in a higher proportion of explained variance in psychological ownership (53.1% in SEM vs. 49.0% in PROCESS), experienced control (64.1% vs. 51.3%), and investment of self (43.5% vs. 40.3%), while the PROCESS analyses explained more variance in the intimate knowing construct (23.1% vs. 14.0%)*. In all, I would place more faith in the validity and reliability results, and in the specific path estimates and indirect effects from the SEM analysis (i.e., *Hypotheses 1 – 4*). Alternatively, testing latent variable interactions in AMOS proved difficult – there are several different techniques with no clear best approach (see [Appendix B](#)). Also, results from the current study were contradictory (e.g., paths were not significant in [Table 15](#), yet the presence of the interaction term improved model fit according to several indices in [Table 17](#)). Thus, I would place more faith in the more consistent PROCESS results for the tests of moderation and moderated mediation (i.e., *Hypothesis 5 and 6*).

To confirm the conditional indirect effects identified in the PROCESS analysis and integrate the two approaches, I used the final CFA model to impute scale scores in AMOS. The newly imputed scores for autonomy, PA, the three routes, and psychological ownership were then used as the variables in the PROCESS moderated mediation model (previously the scale scores consisted of the simple mean scores for each dimension), and the same control variables of age, gender, and tenure were entered. The results were consistent with those of the final

* This may be due to the fact that, in PROCESS, you are not allowed to limit moderation effects to some but not all of the *a* paths in a parallel mediation model. Thus, the PROCESS analysis specified paths from PA and the interaction effect to intimate knowing, thus increasing the number of predictors compared to the SEM analysis where only autonomy was specified as a predictor of intimate knowing. This idea is supported given that the percent of variance in intimate knowing jumps to 20.3% in the exploratory model where both autonomy and PA are specified as predictors.

PROCESS analysis in that no paths or effects dropped from significance or vice versa. The effects shared the same order of strength (e.g., the indirect effect through investment was strongest, while the one through intimate knowing was weakest), but differed in absolute values, such that the strength of the effect sizes tended to be stronger when using the AMOS imputed scale scores. For example, the conditional indirect effect of autonomy on ownership through control at the 50th percentile of PA was higher using the AMOS imputed scales ($B = 0.249$, CI95 0.134 to 0.369) than the previously reported mean scales ($B = 0.159$, CI95 0.076 to 0.245). These findings provide support to the pattern and direction of conditional indirect effects obtained via PROCESS, as the estimates did not change in theme or significance after integrating data from the validated measurement model from the SEM analysis.

Exploratory Path Analysis: PA's Role

With the rejection of the two most interesting and novel hypotheses, a question naturally follows: *What is PA's real role in the development of psychological ownership?* Consequently, I conducted an exploratory analysis to get a better picture of the pattern of PA's direct and indirect effects on the three routes and psychological ownership. Results from the SEM analyses seemed to hint to an alternative explanation to what may be going on in the development of psychological ownership. Looking at [Table 15](#) and [Table 16](#), it is clear employee PA plays a non-trivial role. For example, paths between PA and investment of self ($B = 0.385$, $p = .000$) and experienced control ($B = 0.255$, $p = .001$) were positive and significant. Also, the total indirect effect of PA on psychological ownership through those two variables was significant ($B = 0.243$, 90CI 0.136 to 0.359). This suggests that employees with higher levels of trait PA reported investing more of their time and energy into their work and experienced greater feelings of

control, which in turn had a positive impact on their overall feelings of psychological ownership for their jobs.

To conduct this analysis I decided to take a path analytic approach, whereby scale scores for each latent variable are imputed in AMOS and used as observed variables in the construction and testing of models. This approach has the advantage of simplicity and is often used to model complex models in applied organizational research (e.g., Colquitt, LePine, & Noe, 2000; Grandey & Cropanzano, 1999). As an important note: the same path analysis approach was applied to conduct a reverse-causation analysis, which is provided in [Appendix C](#). Results from this analysis provided strong support for the hypothesized causal direction, in that model fit was strongest when flowing from autonomy and PA to the three routes to psychological ownership when compared to alternative models (e.g., routes → ownership → autonomy and PA; PA → autonomy → routes → ownership).

After imputing scale scores using the final CFA model, I created the path analytic version of the original hypothesized model shown in [Figure 14](#). The only difference was that the interaction term was calculated in the traditional manner used in OLS (as opposed to using the residual approach for latent variable interactions) by obtaining the *Z*-scores for autonomy and PA, then multiplying them. This model is shown in [Figure 17](#), and served as the starting point for the exploratory analysis. To conduct the analysis I followed recommendations by Byrne (2010) for revising a structural model by trimming non-significant paths and using modification indices (MI) to guide the placement of new paths. Bootstrapping (1,000) was used to provide bias-corrected estimates.

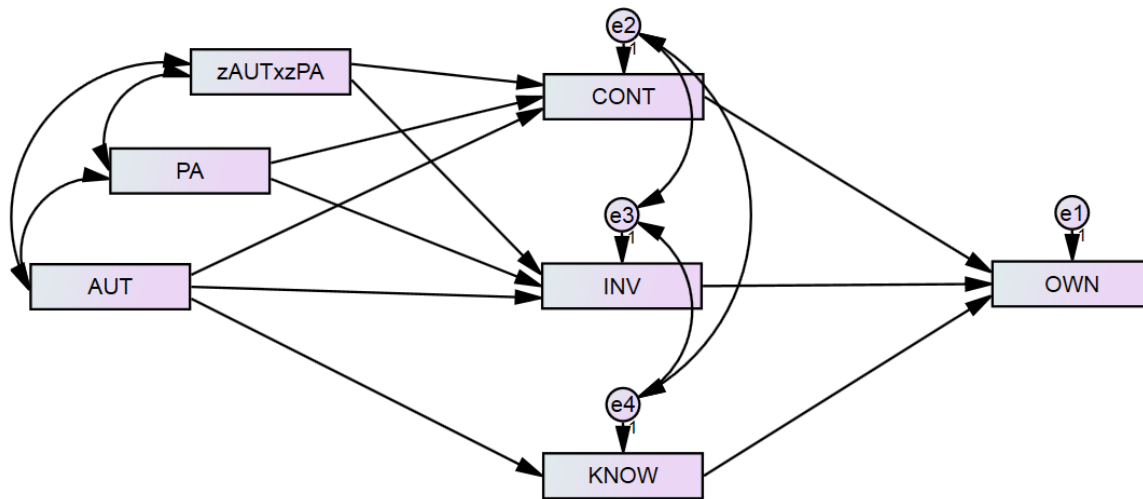


Figure 17. Initial Exploratory Path Analysis Model as Constructed in AMOS. This model was used as a starting point to conduct the exploratory analysis described in this section.

Using the model shown in [Figure 17](#) as a starting point, the model showed mixed fit ($\chi^2 [5] = 47.303, p = .000; CFI = .971; RMSEA = .141$) and a non-significant regression weight between the interaction term and investment of self ($B = 0.008, p = .826$). Therefore, the first revision I took was to delete that non-significant path and rerun the model. The revised model showed improved fit ($\chi^2 [6] = 47.351, p = .000; CFI = .972; RMSEA = .127$), and all paths were statistically significant. To identify further revisions I examined the modification indices as per Byrne's (2010) recommendations and found that adding a path from PA to intimate knowing would significantly improve the overall fit by $\chi^2 = 29.704$. I added that path as my second revision and reran the model again. This third model showed very strong fit ($\chi^2 [5] = 5.813, p = .325; CFI = .999; RMSEA = .020$), had all significant paths, and no MIs that would significantly improve the model's fit. Thus, no further revisions were necessary (Byrne). Expanded fit estimates for all three models are shown in [Table 18](#).

Table 18
Fit Indices for Exploratory Path Analysis Model Revisions

Model	χ^2	df	p	R ²	CFI	PCFI	AIC	RMSEA (CI90)
Original Model	47.303	5	.000	.572	.971	.231	93.303	.141 (.106/.179)
Revision 1	47.351	6	.000	.572	.972	.278	91.351	.127 (.095/.162)
Revision 2 (Final)	5.813	5	.325	.578	.999	.238	51.813	.020 (.000/.072)

Note. R²=squared multiple correlation for psychological ownership; CFI=comparative fit index; PCFI=parsimonious comparative fit index; RMSEA=root mean square of approximation; CI90=90% confidence interval around RMSEA. Original model can be seen in Figure 17. Final model can be seen in Figure 18.

The final resulting path model is illustrated in [Figure 18](#). This model supports the findings of the conditional PROCESS analysis in that PA significantly moderated the effect of autonomy on control ($B = 0.052, p = .045$), and autonomy had an indirect effect on ownership through experienced control ($B = 0.226, p = .002$), investment of self ($B = 0.287, p = .002$), and intimate knowing ($B = 0.022, p = .059$). This model differs from the PROCESS model in that it gives PA a dual role: as a moderator of the effect of autonomy on control, and as a main effect on both investment of self and intimate knowing.

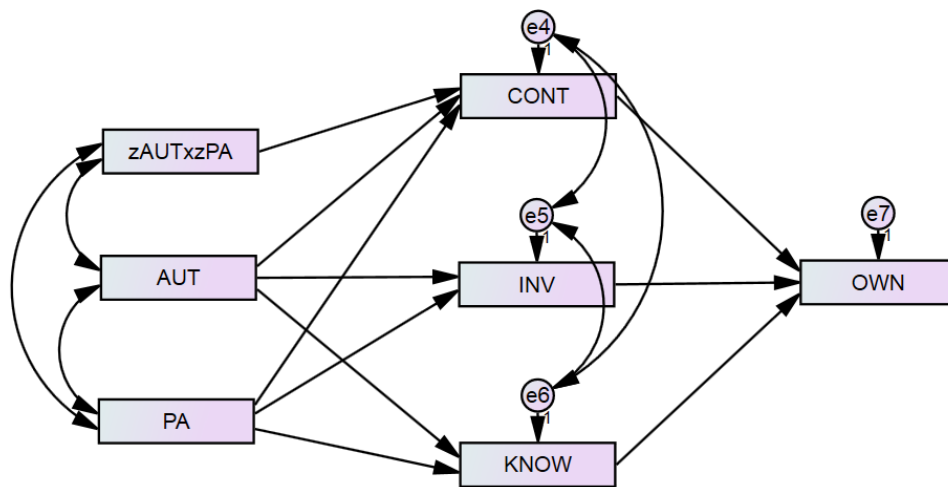


Figure 18. Final Exploratory Path Model. This model suggests that both job autonomy and employee PA promote ownership indirectly through joint and interactive effects on the three routes.

Specific indirect effects and total effects (identified from a matching phantom model) are shown in [Table 19](#). Results indicate that the effects of both autonomy and PA on psychological ownership are fully mediated by their respective routes. Autonomy has a stronger total indirect effect on ownership ($B = 0.535$, CI90 0.456 to 0.606) than PA ($B = 0.363$, CI90 0.273 to 0.444). Similar to the hypothesized model, autonomy's indirect effects were primarily transferred through the investment ($B = 0.287$, CI90 0.219 to 0.367) and control routes ($B = 0.226$, CI90 0.154 to 0.297). PA's effects were also transferred primarily through the investment route ($B = 0.255$, CI90 0.177 to 0.361) and less through the intimate knowing route ($B = 0.045$, CI90 0.002 to 0.096). The interaction term also displayed a significant indirect effect on ownership through control ($B = 0.013$, CI90 0.003 to 0.025), suggesting that the interaction effects carry through to the outcome (i.e., that the mediation is moderated).

Table 19

Bias-Corrected Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects in the Exploratory Model using Phantom Variables

Effect	<i>a</i> path	<i>b</i> path	Mean effect		<i>p</i> ^b	90CI ^a		
			(<i>B</i>) ^a	<i>SE</i> ^a		Lower	Upper	
Indirect Effects								
AUT → CONT → OWN	0.919	X 0.246	= 0.226**	0.044	.002	0.154	0.297	
AUT → INV → OWN	0.565	X 0.508	= 0.287**	0.045	.002	0.219	0.367	
AUT → KNOW → OWN	0.178	X 0.125	= 0.022*	0.014	.059	0.003	0.051	
PA → CONT → OWN	0.258	X 0.246	= 0.064**	0.020	.001	0.034	0.104	
PA → INV → OWN	0.502	X 0.508	= 0.255**	0.054	.001	0.177	0.361	
PA → KNOW → OWN	0.356	X 0.125	= 0.045*	0.028	.085	0.002	0.096	
AUT*PA → CONT → OWN	0.052	X 0.246	= 0.013*	0.007	.030	0.003	0.025	
Direct Effects								
AUT → CONT			0.919**	0.031	.001	0.869	0.977	
AUT → INV			0.565**	0.046	.002	0.486	0.636	
AUT → KNOW			0.178**	0.036	.001	0.124	0.236	
PA → CONT			0.258**	0.060	.002	0.151	0.354	
PA → INV			0.502**	0.081	.002	0.367	0.639	
PA → KNOW			0.356**	0.055	.002	0.262	0.441	
AUT*PA → CONT			0.052*	0.028	.045	0.009	0.100	
CONT → OWN			0.246**	0.047	.002	0.165	0.320	
INV → OWN			0.508**	0.066	.002	0.406	0.621	
KNOW → OWN			0.125*	0.075	.090	0.005	0.259	
Total Indirect Effects								
Total effect of AUT on OWN through the routes			0.535**	0.041	.002	0.465	0.606	
Total effect of PA on OWN through the routes			0.363**	0.052	.003	0.273	0.444	

Note. AUT=autonomy; PA=positive affectivity; CONT=experienced control; INV=investment of self; KNOW=intimate knowing; OWN=psychological ownership. ^a bootstrapped (1,000) bias-corrected estimates; ^b two-tailed significance (also bootstrapped bias-corrected). ** $p < .01$; * $p < .05$ or confidence interval does not include zero.

Practically speaking, this model paints a much different picture than the original model.

In this revised exploratory model, autonomy and PA play the same role as predictors of investment of self and intimate knowing, while autonomy and PA interact to predict experienced control. This model is similar in regards to Hypotheses 1-4 (i.e., autonomy's main and mediated

effects on ownership), yet differs in that it positions PA as a main effect on two of the three routes. In other words, it posits that employees with higher levels of PA will experience greater ownership as they invest more of their energy and believe that they have greater knowledge of their jobs. Regarding the control route, it suggests that autonomy has a stronger effect on control for high-PA employees and less effect for low-PA. On the outcome side, this model indicates that psychological ownership is the result of both job autonomy and PA's (simultaneous) main effects and interactive effects on the routes to ownership. In all, this model suggests a more dynamic and direct role for PA, which seems to support the ongoing claims that affectivity plays a complex role in influencing employee attitudes and perceptions (Forgas & George, 2001).

CHAPTER IV

Discussion

Summary of Findings

The purpose of this investigation was to address the research gaps described in the literature review and examine the process by which psychological ownership develops. Below I present the major findings and level of support for each of the six hypotheses. This is followed by a more detailed discussion of the main, mediated, moderated, and conditional indirect effects, and how they comport with the existing field of literature.

Possibly the most noteworthy finding of this research is the critical role played by job autonomy as the starting point for developing ownership feelings. Results suggest that autonomy may act like a vehicle for driving the key experiences. Employees who rated their jobs as higher in autonomy reported greater control over their work, more investment of themselves in their work, and more intimate knowledge of their work. In turn, these experiences were positively associated with job-based psychological ownership.

Regarding the experiences themselves, psychological ownership was most directly related to the experience of investment. Employees that invested more of themselves and their ideas, talents, and time into their work felt ownership towards their job and experienced it as a part of their self-identity. The experience of control was also a very strong predictor.

Employees that controlled the pace of their work, set their own deadlines, and had control over the things that affect them on the job also felt more ownership. To a lesser extent, intimate knowing was also important, as employees who have a broad and deep understanding of their work felt more ownership towards it.

Also, because job autonomy was positively related to psychological ownership for all employees, those across the entire PA spectrum from sad and apathetic to happy and optimistic can all experience the positive state of psychological ownership toward their work. In fact, the combined mediated effects of autonomy on ownership were slightly larger for the bottom 10th percentile of PA, suggesting that low-PA employees might benefit the most from increased job autonomy. For happy, high-PA employees, autonomy predicted ownership by providing experiences of control and investment, but not at all through intimate knowing. For sadder, low-PA employees, autonomy predicted ownership primarily through investment, then control, and then through knowing.

Finally, exploratory path analysis provided evidence suggesting a more direct role for PA in the psychological ownership process. Specifically, employee PA emerged as a main effect on investment of self and intimate knowing, and had a significant indirect effect on psychological ownership through those two pathways. In other words, high-PA employees tended to invest more of themselves and perceive greater knowledge about their work, which in turn predicted job-based psychological ownership. However, job autonomy still had a much greater total effect on ownership through the routes than employee PA which is good news for practitioners. In summary, when taken together, the findings suggest that *all* employees can experience ownership towards their work when given the right set of experiences. Although some may be more inclined than others (i.e., because they invest themselves more), when provided a high degree of job autonomy and ensuring the right experiences, on average, employees should benefit.

Support for hypotheses. This study applied a fairly complex model to examine how feelings of ownership develop. To organize and communicate the results from both approaches

as they pertain to the main hypotheses I created the table below ([Table 20](#)), which also provides references to the tables and figures that relate to each piece of evidence. Overall, support was found for Hypotheses 1-4, but not Hypotheses 5 and 6.

Table 20
Study Results by Hypothesis

Hypothesis	Extent of Support	Evidence	Reference
Hypothesis 1 : Autonomy will have a strong, positive relationship with job-based psychological ownership.	Full	<ul style="list-style-type: none"> • Strong correlation • Significant total effect • Fully mediated effect (<i>n.s. direct effect in PROCESS and SEM models once the mediators are considered</i>) 	<ul style="list-style-type: none"> • Table 5 • Table 7 • Table 7 and Table 15
Hypothesis 2 : Experienced control will mediate the effect of autonomy on job-based psychological ownership.	Full	<ul style="list-style-type: none"> • Significant indirect effect (<i>PROCESS</i>) • Significant indirect effect (<i>SEM</i>) 	<ul style="list-style-type: none"> • Table 7 • Table 16
Hypothesis 3 : Investment of self will mediate the effect of autonomy on job-based psychological ownership.	Full	<ul style="list-style-type: none"> • Significant indirect effect (<i>PROCESS</i>) • Significant indirect effect (<i>SEM</i>) 	<ul style="list-style-type: none"> • Table 7 • Table 16
Hypothesis 4 : Intimate knowing will mediate the effect of autonomy on job-based psychological ownership.	Full	<ul style="list-style-type: none"> • Significant indirect effect (<i>PROCESS</i>) • Significant indirect effect (<i>SEM</i>) 	<ul style="list-style-type: none"> • Table 7 • Table 16
Hypothesis 5 : Positive affectivity will moderate the effect of autonomy on experienced control.	None ^a	<ul style="list-style-type: none"> • Significant simple moderation (<i>PROCESS</i>) • Moderation approaching significance in moderated mediation model (<i>PROCESS</i>) • Significant moderation of autonomy→knowing→ ownership mediation (<i>PROCESS</i>) • Non-significant latent variable interaction (<i>SEM</i>) • Significant moderation in exploratory path analysis, but not in expected direction (<i>SEM</i>) 	<ul style="list-style-type: none"> • Table 8 and Figure 8 • Table 10 • Table 11 • Table 15 • Table 19

Hypothesis 6 : Positive affectivity will moderate the effect of autonomy on investment of self.	None	<ul style="list-style-type: none"> • Non-significant simple moderation (<i>PROCESS</i>) • Non-significant moderation in moderated mediation model (<i>PROCESS</i>) • Non-significant moderated mediation (<i>PROCESS</i>) • Non-significant latent variable interaction (<i>SEM</i>) 	<ul style="list-style-type: none"> • Table 9 and Figure 9 • Table 10 • Table 11 • Table 15
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Note.^a A significant moderation was observed, but the hypothesis was not supported given that the pattern of simple slopes was not in accordance with original hypothesis. Hyperlinks added to hypotheses (for the theoretical background), tables, and figures.

Hypothesis 1 received support, given that autonomy showed a positive relationship with ownership representing a “large” effect size (Cohen, 1988). Overall, employees who worked in jobs characterized by high autonomy were much more likely to report strong feelings of psychological ownership towards their work. This finding comports highly with psychological ownership theory (Pierce et al., 2003; 2009) as well as self-determination theory (SDT; Deci & Ryan, 1985; 2000)

Hypotheses 2, 3, and 4 received support, given that the relationship between autonomy and psychological ownership was mediated by all three routes of experienced control, investment of self, and intimate knowing. Employees who worked in highly autonomous jobs primarily reported strong experiences of control but also reported greater investment of their focus, attention, and effort into their work, and to a lesser but still significant extent more intimate knowledge about their work. In turn, each of those key experiences contributed uniquely and positively to employee experiences of psychological ownership towards their job. Of the three routes, investment seemed to be the strongest mediator. This suggests that the characteristics of highly autonomous jobs that require or encourage employees to dive in and invest more of their physical and mental energies may be the most direct route to ownership in the current

investigation. Reverse causation analyses (see [Appendix C](#)) served as evidence ruling out the possibility that the three routes were actually impacting autonomy, rather than the other way around. These findings support suppositions made by Pierce et al. (2009) but remained untested until now.

Hypothesis 5 did not receive support. Employee levels of trait PA did moderate the relationship between autonomy and experienced control, but not in the hypothesized direction. In low-autonomy jobs both high-PA and low-PA employees experienced the same lack of control. In jobs with high levels of autonomy, high-PA employees seemed to display inflated perceptions of their level of control when compared to employees with less positive dispositions. This pattern of results is congruent with the affect infusion model (AIM; Forgas, 1995b).

Hypothesis 6 did not receive support. Employee's trait PA did not moderate the relationship between autonomy and investment of self. Rather, it appeared that job autonomy and trait PA had unique positive effects on investment of self. Employees with highly autonomous jobs reported greater investment. Likewise, employees with high trait PA also reported greater investment in their work. These findings are congruent with the job demands-resources model (JD-R; Bakker & Demerouti, 2007).

In summary, the findings from this study shed light on the process by which employees come to identify with and feel ownership towards their job. These insights have both practical and theoretical implications, which are discussed below.

Implications for Practice

Overall, this research has practical importance by providing a clear target (i.e., job design autonomy) to focus developmental efforts that should result in gains in psychological ownership for employees. This is particularly significant when considering the value of psychological

ownership. For example, Brown and colleagues (2014) found that a one-unit increase in psychological ownership corresponded to a \$13.5 million increase in sales at a large packaged goods company. This result suggests that organizations and practitioners who wish to reap the benefits of psychological ownership should direct their efforts towards job autonomy.

Given that this study employed a large and diverse sample of workers in the US, the results and recommendations are more generalizable to the US workforce than would be the case had I used a convenience sample of undergraduate students. Results are most applicable at the individual level to inform practices such as job enrichment and design, management behavior, and employee experiences. These will be discussed below.

Designing jobs that will promote psychological ownership. Regarding job design and the way in which work is done, results showed significant positive relationships between all five job characteristics (Hackman & Oldham, 1975) and psychological ownership. However, job design efforts focused on job autonomy should have a stronger effect on psychological ownership given that autonomy contributes more to psychological ownership than the other four job characteristics (as illustrated in [Appendix D](#)) and can facilitate all of the key experiences (i.e., control, investment, and knowing) that directly give rise to ownership (Pierce et al., 2009). Likewise, results suggest that autonomy contributes more to ownership than employee PA (see [Table 19](#)) and can even overcome the effects of disposition, such that even the most apathetic employees can develop strong ownership feelings when they are afforded a high degree of autonomy (Bullock, Longabaugh, Kendall, & Cook, 2015).

Because the relationship between job autonomy and the three routes were not dependent on employee trait PA (or at least not in any way that would negate the effect of autonomy), managers and practitioners do not need to consider “when” or “for whom” job autonomy will

promote psychological ownership: it should promote ownership for virtually every employee. There are several ways to increase autonomy using job design methods. It is important to note that vertical restructuring methods that provide more authority and independence (e.g., job enrichment) will have more impact on autonomy than horizontal methods that add a variety of new tasks (e.g., job enlargement). In other words, instead of adding more boxes to check, job enrichment practices focus on giving employees the authority to check their own boxes. Specific enrichment activities that can promote autonomy include: providing employees with various methods to schedule their work (e.g., flextime, remote working, working from home), allowing employees to determine the methods used to complete their work, allowing employees to decide when and how to assess the quality of their work (or a single project), removing excessively bureaucratic processes, removing layers of approval to allow employees with complete authority to make specific decisions, encouraging employees to solve problems by applying their own judgement rather than calling on their manager for help, involving employees in strategic planning and decision-making activities (Cordery, 1999; Lunenburg, 2011).

Managerial behavior that can encourage ownership. Job design interventions can seem like a tall order for many organizations, so another approach to encourage autonomy is through manager or supervisor behavior. Specifically, when giving directions for specific tasks or projects to staff, managers should clearly specify the desired end-result or product, but leave the means of achieving the end result up to the employees who are working on it. Hackman (2002) suggests that this type of approach will promote self-managed and goal-oriented work. Managers should also take care to avoid certain practices that constrain autonomy, such as micromanaging, excessive monitoring and reporting, or using approval processes as a means of checking in on staff. Finally, managers can have a strong impact on autonomy by involving

employees in decision-making and problem solving tasks. This is as simple as giving employees a “seat at the table” when making decisions that affect employees and their work.

Key experiences that lead to ownership feelings. It is also important to consider the routes by which autonomy predicts ownership. Autonomy displayed an indirect effect on ownership, which means that it predicted ownership through its relationships with three key experiences. These include experienced control, investment of self, and intimate knowing. To the extent that activities and behaviors promote autonomy, they could be expected to have their positive effects indirectly by encouraging those key experiences. Therefore, it is also important to ensure that employees have the experience of control. Spector (1986) notes that job design and leadership practices designed to enhance autonomy and involvement will fail to achieve positive outcomes if they do not also enhance the feeling of control in a meaningful way. For example, while employee involvement groups can help members experience some control by suggesting and implementing process improvements to their work, they will only result in the experience of control for the employees that are directly involved – they add nothing to the experience of nonmembers in this regard.

Autonomy had the strongest indirect effect on ownership by encouraging employees to invest more of themselves in their work (i.e., their energy, time, ideas, effort). Of all three routes investment showed the strongest relationship with ownership. Therefore, it is also important to ensure that any efforts to increase autonomy are implemented in such a way that the outcomes of employees’ work depend on employees’ own initiative and effort. Doing this may require giving employees the “space” to act, behave, experiment, and try new things. If they are not given the freedom to try, their investment – and therefore their ownership – may be constrained.

Finally, autonomy had a slight but significant indirect effect through intimate knowing, such that employees come to develop more knowledge, familiarity, and understanding of their work as they seek out and apply job-related information to solve problems and make decisions. Therefore, this finding suggests that if sources of knowledge are constrained, or employees are blocked from access to the information they might need to make decisions or accomplish tasks, the result might be limited effects on ownership. Therefore, it is important to keep information, and access to information, open and clear.

Caveat: The value of low-PA workers. Given some of the positive relationships between PA and desirable outcomes such as investment of self, it is important to also give a final caveat about the role of employee PA. Specifically, I do not wish to leave readers with the conclusion that “more is better” when it comes to PA. Dispositional mood should never be used in the context of selection as a way to hire the energetic and happiest applicants while weeding out any potential “Gloomy Gus’s.” In fact, there is a wealth of research on the positive effects of negative moods (e.g., sadness and low PA) on outcomes that are important and relevant for organizations (for a review of the literature, see Forgas, 2013). Experimental studies have found many different “positive” effects of negative moods. Such studies have demonstrated that sad people are better at detecting deception and distinguishing truth from lies (Forgas & East, 2008), they are less likely to make errors in judgement such as the fundamental attribution effect due to their tendency to take a more detailed approach to processing information (Forgas, 1998), they are less likely to rely on racial stereotypes in certain situations (Forgas), they are more likely to allocate resources fairly, as opposed to those in a happy (induced) mood who engaged in more selfish behavior (Tan & Forgas, 2010), they produce more effective persuasive arguments (Forgas, 2007), and make better decisions than high PA counterparts in situations where it is

important to recognize negative information or when decisions might contradict currently held opinions (Forgas, 2001). Given this evidence, it should be clear that both high *and* low PA workers can add value in their own ways (e.g., through optimism, drive, and investment from high-PAs, and through critical thinking, persuasive arguments, and fair behavior from low-PAs).

Implications for Theory

The study of job and organization-based psychological ownership is still in its nascent stage. As such, exploratory studies like this that integrate individual characteristics should continue to be important for the advancement of psychological ownership theory. This study responded to questions posed by Pierce and Jussila (2011) about whether and how traits matter by suggesting a dual role for trait PA: as a main effect on investment of self and intimate knowing and as a moderating effect on the relationship between job autonomy and experienced control (depicted graphically in [Figure 18](#)). This line of inquiry will allow us to answer not only the question of how ownership develops for person X vs. person Y, but the question of how we can facilitate this positive state for person A through Z. Results from the current investigation have strong implications for ownership theory by providing evidence of claims previously made but untested (e.g., Pierce et al., 2009) and illustrating ways in which it could be integrated with other recognized models of employee attitudes, personality and motivation. This section will summarize the high points from this study as they relate to the theory of psychological ownership, the job demands-resources model (JD-R), the affect infusion model (AIM), and self-determination theory (SDT).

Psychological ownership theory and job characteristics. Regarding the psychological ownership theory from which this study was largely designed, I found strong support for the continued integration of psychological ownership into job design and the JCM. All of the

propositions described by Pierce et al. (2009) regarding the relationships between autonomy, the three routes (experienced control, investment of self, and intimate knowing), and psychological ownership were supported. For example, results reinforced the prediction that autonomy would promote all three routes to ownership and therefore have a stronger relationship with job-based psychological ownership when compared to other job characteristics (e.g., task identity, task significance, feedback, and skill variety).

Psychological ownership theory and owner traits. Moreover, results from the current study do not contradict Pierce and colleagues' (e.g., Pierce et al., 2001; 2003; Pierce & Jussila, 2011) assertions about the nature of the relationship between psychological ownership and individual traits (three assertions are described in the section entitled *Experienced by all*). Specifically, (1) PA did play a moderating role in the development of ownership feelings (by interacting with job autonomy), (2) psychological ownership was not limited by employee PA (low-PA employees experienced as much ownership as high-PA employees), and (3) PA did not appear to directly cause psychological ownership (although results did support an indirect effect through investment and knowing). These three points are very important because they not only provide further support to Pierce and colleagues' original theories on psychological ownership, but they show that integrating individual traits can provide fruitful insights without contradicting existing theory.

Job demands-resources model. Results from this study suggest that job autonomy and PA both promote ownership indirectly by acting as resources that facilitate investment and engagement in work. According to the JD-R model, engagement is enhanced by organizational resources such as job autonomy and personal resources (Bakker & Demerouti, 2007). Trait PA has long been conceptualized as a personal resource (Fredrickson, 2001) that also encourages

people to take a more expansive and engaged role in their work (Lyubomirsky et al., 2005). The current study found support for both resources. Specifically, job autonomy and PA showed significant positive relationships with employee perceptions of their investment of ideas, talents, and time in their work (see [Figure 18](#)). Specifically, just as personal and job resources promote employee engagement they may also allow employees to invest more of themselves and their energy in their work, and in turn develop feelings of ownership.

Affect infusion model. Two findings from this study can be understood through the lens of the AIM: the moderating effect of PA on the relationship between autonomy and experienced control, and the main effect of PA on intimate knowing. The AIM describes how affect “infuses” (i.e., colors) employees’ cognitions, decisions, and behavior by priming thoughts and memories that are congruent with mood (Forgas & George, 2001). A central tenet of the AIM is that mood has a stronger effect on perceptions in complex situations and vice-versa little to no effect in situations characterized by simple and direct tasks (Forgas, 1995b). In the current study, this was mirrored in the finding that PA had a stronger influence on employee perceptions of control in jobs with high degrees of autonomy and almost no influence in low-autonomy jobs (see [Figure 8](#)). This suggests that high-PA employees were prone to the illusion of control in the complex situations represented by high-autonomy jobs.

Employee PA also had a positive effect on intimate knowing, such that employees that were characteristically more optimistic, enthusiastic, and happy also tended to report greater levels of intimate knowledge about their jobs (see [Table 19](#)). The AIM describes how affect can influence the content of thoughts by focusing attention on information that is congruent to one’s affective experience (Forgas, Bower, & Krantz, 1984). For example, high PA individuals have been found to be less critical of themselves and their performance (Mongrain & Zuroff, 1995)

while individuals experiencing negative affect tend to make more accurate judgements and are less prone to biases like the fundamental attribution error (Forgas, 1988). In this sense, PA could influence perceptions of knowledge by encouraging happy workers to respond with “rose-colored glasses” while encouraging low-PA workers to make more accurate (i.e., less inflated) judgements of their knowledge.

It is important to note that inflated perceptions of control or knowing are not necessarily “bad” things. As Barrick, Mount, and Li (2013) note, “perceptions are critical – a person can only respond to the situation he or she perceives” (p. 139). Thus, employees who experience positive moods and emotions and perceive greater control or intimate knowledge of their work are even more likely to experience psychological ownership towards their jobs. This is not a bad outcome at all. As Brief and Weiss (2002) note in a seminal review of affect in the workplace, “moods and interpretations are unlikely to be independent” (p. 285).

Self-determination theory. Even after controlling for the effects of PA, job autonomy still showed a strong and positive relationship with ownership through its influence on the three routes. Aside from being one of the most optimistic findings from this research (because it suggests that employees with even the most apathetic and morose dispositions can develop feelings of ownership towards their work and experience it as a part of their self-identity), this pattern also supports central tenets of SDT. According to SDT, autonomy is an innate psychological need (Deci & Ryan, 1985; 2000). Environments that support autonomy can encourage people to internalize an activity such that they perceive it as instrumental for their own personal goals (Gagné & Deci, 2005).

In the current study, the positive relationship between job autonomy and experienced control comports with previous SDT studies that have shown how job autonomy positively

contributes to the psychological need to experience self-determined control when carrying out an activity (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). Likewise, the positive relationship between job autonomy and investment of “self” and effort into work supports the SDT notion that autonomous jobs should increase motivation as employees internalize their job duties as being important to their sense of self (Gagné & Deci, 2005). In fact, the internalization and need fulfillment processes proposed by SDT seem to parallel the internalization processes described by psychological ownership theory, suggesting overlap in the two theories.

In summary, the current investigation found the strongest support for current psychological ownership theory but also revealed patterns that integrate well with other models. The positive relationships between job autonomy and employee PA with employee levels of investment in their work supports the JD-R model. The bias shown by high-PA employees on perceptions of control as well as the effect of employee PA on perceptions of intimate knowledge can be explained by the AIM. Finally, the effects of job autonomy on ownership can also be explained through SDT.

Limitations

There are a few limitations associated with the method and inferences that can be made from this research. Most of the limitations in the current study stem from the single-source cross-sectional nature of the research design, which can lead to significant method bias. Other limitations include incongruent levels of analysis, and the use of cross-sectional data to test mediation hypotheses that imply causal flow. This section will describe each limitation and how it was addressed in the design of the research, analysis of data, or inferences that can be drawn from findings. Before starting in, it is important to recognize the ongoing (and often heated)

debate surrounding the validity of research using single-source cross-sectional data. As it is beyond the scope of this paper to address these arguments, I will instead refer the reader to studies that have investigated the effects of method bias in this type of research design. Burch, Young, Dalal, and Carter (2015) applied new, sensitive analytic techniques based on multidimensional item response theory (MIRT) to assess method bias and found that longitudinal data did not have significantly less bias than cross-sectional data. This suggests that a time-lagged approach may not have had any substantive impact on the results of this study. For more critical perspectives on how method effects can bias results in studies using cross sectional data, I would refer the reader to Doty and Glick (1988) and Podsakoff et al. (2003).

Method bias. The major limitation of cross-sectional research is common method bias, or the idea that whatever relationships between variables that is found is, at least partly, due to the fact that a single method was employed to collect data. To manage common method bias in the design of this study, I carefully followed recommendations for survey design and analysis presented by Podsakoff et al. (2003).

Regarding survey design, I applied procedural remedies to create psychological distance between predictor and outcome variables by doing three things. First, I “hid” the measure of job autonomy (the IV) in the larger job diagnostic survey, which includes measures of autonomy, task identity, task significance, skill variety, and feedback (Idaszak & Drasgow, 1987). Second, I included filler measures between the routes scales and the psychological ownership scale, that included measures of self efficacy, belonging, territoriality (Avey et al., 2009), and job satisfaction (Weiss, Nicholas, & Daus, 1999). Third, I created more psychological distance by employing different response methods for each construct (e.g., sliding scale for job characteristics, five-point scale for PA, seven-point scale for psychological ownership).

Theoretically, these design tactics should have reduced potential demand characteristics (i.e., making it harder for respondents to guess what the researcher wants to see) and made the job characteristic ratings less salient in the participants' minds when they completed outcome measures like experienced control and psychological ownership (Podsakoff et al., 2003).

Regarding analysis, to diagnose whether method bias presented a serious threat to the validity of my findings I conducted a Harman's single-factor test and applied the single-common-method-factor approach. Results from Harman's test (see Podsakoff et al., 2003, p. 889) were positive and showed that a single factor accounted for 30.7% of variance in all survey items. Results from the single-common-method-factor approach (see Podsakoff et al., p. 896) indicated that method bias accounted for 36% of the variance among the items used to test my hypotheses. At the granular level, results also indicated that method effects were limited to items used to measure trait PA (see [Table A2](#)). Given that the results from both diagnostic tests were well under the 50% cutoff, and that method effects were largely limited to a single dimension, I concluded that method bias did not pose a significant threat and decided not to use statistical remedies to control for method effects when testing formal hypotheses.

It is likely due to those procedural remedies applied during the design stage that the results from this study had less common method variance than one might expect with a cross-sectional online survey. However, the amount of common method variance was still greater than zero. Thus, if this study were to be reproduced using longitudinal methods or self and other-report data, one might expect to find smaller effect sizes given that method bias is commonly thought to inflate the magnitude of relationships between variables of interest (Doty & Glick, 1998). These results also have academic value because they show that taking steps to reduce

demand characteristics and increase psychological distance, cross-sectional research can indeed provide data that is relatively free from common method bias.

Level of analysis. Level of analysis is an important consideration in this study because of the inclusion of variables that measure both individual-level phenomenon (e.g., psychological ownership, trait affectivity, experienced control) and job-level characteristics (e.g., autonomy). Issues arising from incongruent levels of analysis are common in research involving job characteristics (Morgeson & Campion, 2002), where individual difference variables such as individual growth-need strength have been traditionally examined as moderators of the relationship between job-level variables like autonomy and yet more individually experienced outcomes like experienced meaning and job satisfaction (Hackman & Oldham, 1975). Psychological ownership presents a similar conundrum. It is experienced at the individual level as a cognitive affective state, yet it is developed as job-related features provide various experiences that fulfill an individual's psychological needs (Pierce et al., 2009).

Morgeson and Campion (2002) recognize that there are bound to be discrepancies in the level of measurement and the level of theory in this type of research, and recommend choosing a level of measurement that is guided by one's theoretical model. In the current study, I feel justified using individual-level measures for three reasons. First, because psychological ownership is an inherently individual phenomenon. It is a state that is experienced individually as the result of key experiences (e.g., control, knowing) that are also experienced individually (Pierce et al., 2009). Second, job autonomy is measured as the individual perception of job incumbents, which have been found to be acceptable informants of objective job characteristics (Fried & Ferris, 1987). Third, the moderator of employee trait disposition (i.e., PA) is also an individual-level disposition variable. Overall, the theory that drives this research – the

development and experience of psychological ownership across the dispositional spectrum – describes an inherently individual-level phenomenon.

Statistical inference. Another limitation of this study lies in the inferences that can or cannot be made based on the use of cross-sectional data to test mediation hypotheses that intrinsically imply causal flow. Irrespective of one's personal views, the use of cross-sectional data to test mediation models is extremely common in the literature. In a review of psychology literature, Maxwell and Cole (2007) found that, in 2005, 39% of the articles published in APA journals that included mediation tests in their titles or abstracts used completely cross-sectional data. Many of the studies on psychological ownership that were cited in this paper are also based on tests of mediation models using cross-sectional data (e.g., VandeWalle et al., 1995; Pierce et al., 2004; O'Driscoll et al., 2006; Mayhew et al., 2007; Liu et al., 2012). However, providing such a list is not meant to serve as an excuse but rather an illustration of the current state of research. The important thing to keep in mind when considering these types of studies is the inferences that can be made based on their findings. While some may argue that mediation analysis implies causality by its very nature, most scholars understand that causality can only be truly inferred under the three conditions described by Shadish et al. (2002): that the IV must precede the DV in time, that the IV and DV are correlated, and that alternative explanations have been ruled out (this is usually accomplished through some type of randomized experimental design). By these conditions, even most longitudinal tests of mediation still fail to adequately meet all three conditions in that they fail to rule out alternative explanations unless they employ experimental manipulations.

Returning to the current study, given the nature of the method and the limitations of cross-sectional designs, I cannot assert claims of causal relationships based on the current

findings, no matter how promising. However, the central pieces of the model (i.e., the indirect effects of job characteristics on psychological ownership) are based on sound theory and supported by longitudinal and multi-source data (e.g., Brown et al., 2014). The addition of employee PA to the model does add some degree of causal complexity, given that a number of studies have shown that affect can display bidirectional and reciprocal relationships with a number of other things, such as close relationships (Ramsey & Gentzler, 2015), success (see Lyubomirsky et al., 2005 for a review), and job satisfaction (Judge & Ilies, 2004). Therefore, more rigorous designs will be required to tease out the “reality” of PA’s role in the development of ownership.

Although the results of the exploratory analysis cannot confirm that PA does indeed cause employees to invest more of themselves and report more knowledge, there is some theoretical support for its placement as a predictor (e.g., AIM; Forgas & George, 2001). Likewise, results from the reverse causation analysis (see [Appendix C](#)) also indicated that the original hypothesized model and the exploratory models had substantively stronger fit to the data when compared to several models with alternative causal flows (e.g., from the three routes to ownership to autonomy and PA; from PA to autonomy to the routes to ownership). While this result does not substitute for longitudinal or experimental methods, it does nonetheless provide support to the direction of findings from employee and job to ownership through the routes as originally hypothesized.

Future Directions

Historically, psychological ownership came into being as a theory to explain why formal employee ownership programs often failed to have their desired effect (Pierce & Jussila, 2011). As a concept, psychological ownership is relatively “young,” in that psychological ownership

theory is only 14 years old. This seems even younger when compared to other work-related states like job satisfaction (well into its 80's), experienced meaningfulness (in its 40's), and even employee engagement (mid 20's). However, in the few years that it has been studied it has shown great promise as a construct of interest. It shows consistent medium to strong relationships with a number of attitudinal, motivational, and behavioral outcomes (Avey et al., 2009; Brown et al., 2011; Mayhew et al., 2007; Ozler et al., 2008). There is also evidence that it may be one of *the* central mechanisms that explain how work characteristics influence desirable outcomes like motivation and performance (Brown et al., 2014).

Scholars like Jon Pierce, Tatiana Kostova, Kurt Dirks, Iiro Jussila, Lynn Van Dyne, Graham Brown, and others have done a tremendous amount of work laying its theoretical foundation and developing valid instruments to measure psychological ownership and its antecedents. Dozens of studies have assessed its propositions and outcomes and have found support for its nomological network (see Pierce & Jussila, 2011). More recently, it has been integrated into other established fields like consumer psychology (Brasel & Gips, 2014), information systems (Gaskin & Lyytinen, 2012), and the field of positive organizational behavior (Avey et al., 2009), as well as theories like the job characteristics model (Pierce et al., 2009) and organizational justice theory (Ahmed, 2014).

Nonetheless, there is still much work to be done. First is the need to continue studying the role of individual traits, particularly PA. The current study indicated that PA might play dual roles: as an indirect effect (by acting as a resource for employee investment, or a biasing role by inflating perceptions) and as a moderator effect (by strengthening or weakening the effect of autonomy on experienced control). One valuable direction that future studies could take regarding the role of affect would be to employ experimental designs that involve the priming of

positive or negative moods. By priming either a happy or a sad state, researchers could begin to tease out whether positive moods truly do cause people to develop ownership feelings for targets as result of investing more or less of themselves or perceiving a stronger sense of familiarity. Future studies should also go beyond PA to examine whether other traits play a role in the model of ownership (Pierce & Jussila, 2011). One other study looked at locus of control and individualism (McIntyre et al., 2009), what about the Big Five? Given the strong overlap between PA and extraversion (Watson & Clark, 1992), that might be a good place to start.

Second is the need to use experimental designs and interventions. After reading and assimilating much of the research on psychological ownership in the organizational context, one thing became inherently clear: there is a dearth of experimental studies that investigate how and when employees come to develop feelings of psychological ownership for their jobs and companies. Most of the studies cited in this paper are based either on cross-sectional or longitudinal designs, and while some employ ratings from multiple sources, almost none of the cited studies employ randomized experimental designs. Zhu, Burmeister-Lamp, and Hsu (2014) employed an experimental vignette design and found that participants who were induced to feel psychological ownership towards a hypothetical entrepreneurial venture were significantly less likely to quit the venture. They also found that this effect was partially mediated on hindrance-related stress, such that participants with greater ownership reported significantly less stress. Studies like this that experimentally manipulate psychological ownership or its antecedents will not only help to establish causal flow to and from psychological ownership, but will also advance the credibility of ownership theory. Finally, for a more comprehensive review of unanswered questions and research needs relating to psychological ownership, I would direct the reader to Pierce and Jussila (2011, pp. 265-277).

Conclusion

Job-based psychological ownership is a complex state that reflects employees' feelings of possession towards their jobs (Mayhew et al., 2007), and is experienced when employees incorporate their work into their extended self-identity (Pierce et al., 2001). A host of studies have established the positive outcomes of psychological ownership (Avey et al., 2009; Brown et al., 2014; Mayhew et al.), yet relatively few have examined antecedents like job autonomy (O'Driscoll et al., 2006) and key experiences like control, investment, and knowing (Brown et al.). Even fewer studies have incorporated individual traits (McIntyre et al., 2009). The nature of this study was somewhat exploratory in that, to the best of my knowledge, no previous investigations have examined (a) the relationship between job autonomy and the three routes to ownership nor (b) trait affectivity and psychological ownership. These gaps were addressed by testing a set of hypotheses that formed a complex moderated parallel mediation model. Although employee PA did not behave as predicted, results still provide a new and deeper understanding of how employees come to develop positive feelings of ownership towards their work. By designing jobs to provide employees with the freedom and autonomy to make decisions about their work, organizations can expect to reap the positive benefits of psychological ownership (e.g., increased accountability, commitment, satisfaction, citizenship behaviors, and more). Furthermore, job-based psychological ownership appears to be a state that is particularly open and accessible, in that it is not limited to people of one type or another. Given opportunities to experience control, invest their energy, and develop an intimate understanding of their work, all can experience this positive and fulfilling psychological state.

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Appendix A: Diagnosis of Common Method Variance in AMOS

Appendix A

Diagnosis of Common Method Variance in AMOS

Because of the cross-sectional method used to collect data in this investigation, it was prudent to conduct a more rigorous assessment of mono-method bias than Harmon's single factor test. This was done using the single-common-method-factor approach, where all items from the final CFA measurement model (see [Figure 13](#)) were loaded onto a common latent factor (CLF). This approach has the benefit of estimating method bias at the measurement level and, if necessary, controlling for measurement error in subsequent analyses if it is revealed to be a significant issue (Podsakoff et al., 2003). Figure A1 below shows the measurement model after inserting the CLF.

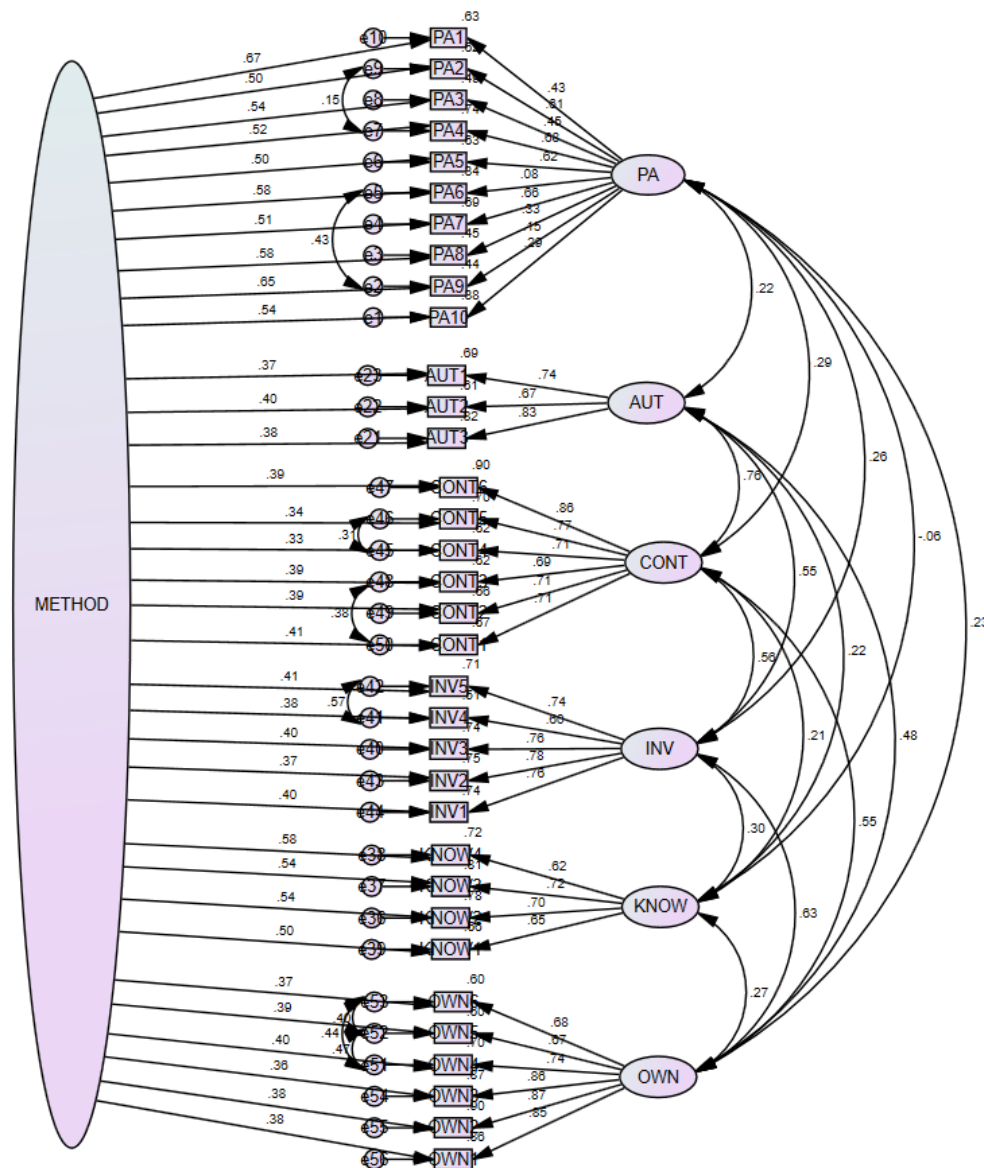


Figure A1. Measurement Model with Common Latent Factor. Standardized estimates are shown.

By analyzing this model after constraining all regression parameters from the CLF to the observed variables to be equal, the results indicated an unstandardized regression weight of .60. Squaring this value gives us 36%, or the percent of variance in the measurement model that is due to method bias (Podsakoff et al., 2003). Although slightly higher than the result of the Harman’s test, this result nonetheless indicates that method bias was present but not strong

enough to warrant additional ex-post remedies. Regarding overall model fit, adding the CLF resulted in a slight but statistically significant improvement in model fit according to the difference in chi-squared. Model fit comparisons with and without the CLF are presented in Table A1 below.

Table A1
Comparing Measurement Model Fit With and Without the CLF

Model	X^2	df	Model comparison	ΔX^2	Δdf	Fit1 (CFI)	Fit2 (PCFI)	Fit3 (RMSEA)
M1	1073.947	504				.952	.855	.052
M2	1009.923	503	2 vs. 1	64.024*	1	.957	.858	.049

Note. M1=final measurement model without CLF (Figure 13); M2=final measurement model with CLF (Figure A1). * $p < .05$

Although overall model fit improved after adding the CLF, reviewing the pattern of changes among regression weights for individual items provides a more accurate picture of where and how method bias influences the model (Richardson et al., 2009). Looking at the specific item-factor relationships, all items but one had significant relationships with their factors. Specifically, PA6 became non-significant after adding the CLF ($B = .219, p = .157$). This is not surprising given that the same item had the weakest loading before adding the CLF, as can be seen in [Table 13](#). Comparing the standardized regression weights between models also provides an assessment of where the method effects are strongest.

When the addition of a CLF results in a drop in standardized loading of .20 or more (i.e., $\Delta\beta > .20$), method bias may have a substantive effect (Gaskin, 2012). Studies have also shown that method bias can have an unequal effect on different measures of similar or different constructs. For example, a meta-analysis by Cote and Buckley (1987) found that method variance ranged from 22% to 41% across different types of constructs.

Table A2 shows the difference in standardized regression weights for the final measurement model without the CLF (i.e., [Table 13](#)) and with the CLF. Results from this comparison indicate that the CLF resulted in a substantive reduction in the loadings of several items from the PA dimension. No other factor showed significant changes in the pattern of item-factor loadings, suggesting that method bias was largely limited to the trait PA dimension. It is unclear why this factor in particular was susceptible to method effects. However, because they appear to be limited to PA, and because controlling for them in subsequent analyses would require that they be controlled for across all constructs, I decided not to control for method effects using the CLF approach when assessing the final structural model.

Table A2
Difference in Standardized Regression Weights after Adding CLF

Latent variable	Indicator	β		Difference
		Without CLF	With CLF	
Positive Affectivity	PA1	0.781	0.432	0.349*
	PA2	0.681	0.610	0.071
	PA3	0.729	0.452	0.277*
	PA4	0.819	0.679	0.140
	PA5	0.777	0.619	0.158
	PA6	0.481	0.082	0.399*
	PA7	0.814	0.659	0.155
	PA8	0.695	0.331	0.364*
	PA9	0.597	0.146	0.451*
	PA10	0.633	0.291	0.342*
Job Autonomy	AUT1	0.799	0.745	0.054
	AUT2	0.770	0.671	0.099
	AUT3	0.904	0.827	0.077
Experienced Control	CONT1	0.805	0.706	0.099
	CONT2	0.805	0.709	0.096
	CONT3	0.785	0.687	0.098
	CONT4	0.758	0.712	0.046
	CONT5	0.810	0.766	0.044
	CONT6	0.933	0.862	0.071
Investment of Self	INV1	0.857	0.76	0.097
	INV2	0.857	0.784	0.073
	INV3	0.860	0.761	0.099
	INV4	0.692	0.599	0.093

	INV5	0.838	0.737	0.101
Intimate Knowing	KNOW1	0.805	0.647	0.158
	KNOW2	0.885	0.700	0.185
	KNOW3	0.885	0.716	0.169
	KNOW4	0.826	0.623	0.203*
Psychological Ownership	OWN1	0.924	0.846	0.078
	OWN2	0.949	0.867	0.082
	OWN3	0.927	0.859	0.068
	OWN4	0.833	0.740	0.093
	OWN5	0.763	0.674	0.089
	OWN6	0.762	0.680	0.082

Note. ($N = 426$). β =standardized regression weights. * substantive method effect (i.e., β reduced by $>.20$ after adding CLF).

Appendix B: Method Used to Create the Latent Variable Interaction Term

Appendix B

Method Used to Create the Latent Variable Interaction Term

This appendix describes in detail my approach and rationale for creating the latent variable interaction term that was used to test moderation hypotheses using SEM. Kenny and Judd (1984) proposed the original method whereby the latent variable interaction term was created using all of the pairwise products of the items for each variable. However, this approach requires the researcher to impose complex non-linear constraints, which are not possible in AMOS. More recently, Little et al. (2006) developed a method for creating product terms that can be used in any SEM software platform. This method is based on Lance's (1988) original two-step approach for residual centering in moderation analysis and creates indicators for the interaction effect that are completely orthogonal (i.e., unrelated) from the main effect variables. This is important because collinearity between items on the predictor and interaction variables leads to regression estimates that are unstable, such that even small fluctuations in the sample can result in major differences in regression estimates and their significance (Little et al., 2006). This is why in ordinary least-squares regression predictors are mean-centered or standardized before creating interaction terms (Aiken & West, 1991). In SEM, when latent variables often have many predictors, it is even more important to make sure that the huge number of pairwise combinations of predictor items do not show collinearity.

Following Little et al.'s (2006) method, I created new items for the latent interaction variable that were orthogonal from the main effects. To do this I did the following: first, I created standardized versions of the three items in the autonomy (X) dimension and the ten items in the PA (W) dimension. Then, I created product terms using all of the possible combinations of items from the two constructs. This led to 30 new variables (e.g., $X1*W1$, $X1*W2$, $X1*W3$,

etc.). Next, in creating orthogonal versions of these items I had to remove all of the information contained in the autonomy and PA dimensions from the new product terms. This was accomplished by conducting 30 separate regression analyses, using each product term as the dependent variable regressed onto the 13 autonomy and PA items. Residuals from each regression were saved to the database. It is the residual values themselves that would be used to form the interaction term.

However, in loading the interaction term I faced some difficulty because of the problems resulting from adding error covariates to ensure unbiased estimation of the interaction effect. Specifically, Little et al. (2006) specify that any of the residuals that share common indicators should be allowed to correlate. In my SEM model, this meant adding 90 error covariances on the 30 indicators of the interaction term. This led to serious model identification problems. Given the examples used in Little and colleague's manuscript, I believe their approach was intended for three to five item constructs. To address this, I simplified the interaction term by reducing the number of items from 30 to nine. In deciding which items to remove, I followed recommendations by Marsh et al. (2004) by selecting the three items from each dimension with the highest factor loadings. Because autonomy had only three items, all of those were selected. For PA, I referred to the factor loadings in [Table 13](#) and selected the three best items. Identifying all pairwise combinations resulted in nine items. Following the same process as before, each combination was regressed on all items and residuals were saved. The resulting nine items (completely orthogonal to autonomy and PA) were loaded onto the interaction term in AMOS, and error covariances were used to connect items that shared a common indicator (Little et al., 2006). This resulted in a less complex and more manageable interaction term that successfully ran in AMOS.

Using this approach to create orthogonal interaction terms simplifies the interpretation of results and yields similar estimates to other methods for identifying interaction terms in SEM (Lance, 1988; Little et al., 2006). As the interaction term is completely unrelated to the predictor (autonomy) and the moderator (PA), any effect it has on other variables in the model are considered above and beyond the effects of the first-order variables (autonomy and PA). To the extent that the paths between the interaction term and its outcomes are significant, moderation is supported. Finally, another benefit of this approach is that it allows one to compare overall model fit with and without the interaction term. Because the interaction is orthogonal from the main effects, any change in model fit can be directly attributed to the moderator.

Appendix C: Reverse Causation Analysis

Appendix C

Reverse Causation Analysis

Because the current study employed a cross-sectional design to test mediation hypotheses which *infer* causal direction, it was necessary to rule out alternative explanations by conducting a reverse causation analysis. In this analysis, I used a path analysis approach using the AMOS imputed scale scores to increase the simplicity of the model and ease of interpretation. This section reports model fit for the original hypothesized model (Figure C1), the exploratory model (Figure C2), and several reverse causation models. To the extent that the original models fit the data better, there is more support for the direction of effects that were hypothesized or discovered (in the case of the exploratory model).

Four reverse causation models were developed, with paths from the routes to ownership to autonomy and PA (Reverse Model 1, Figure C3), the routes to autonomy and PA to ownership (Reverse Model 2, Figure C4), PA to autonomy to the routes to ownership (Reverse Model 3, Figure C5), PA to the routes to ownership to autonomy (Reverse Model 4, Figure C6), and finally PA and autonomy to control and investment to knowing, then to ownership (Reverse Model 5, Figure C7). The last model was built specifically based on concerns that, compared to the other two routes, intimate knowing might be better conceptualized as an outcome of control and investment, rather than co-occurring beside them as a parallel mediator (as described in the section entitled *Relationships between the routes and psychological ownership*). Model fit for the original, exploratory, and reverse causation models are all provided in Table C1 below. According to all but one fit index (*PCFI*), the final exploratory path model fit the data substantially better than any other model. Also, when compared to the various reverse causation models, the original hypothesized model showed stronger fit based on several indices (χ^2 , *CFI*,

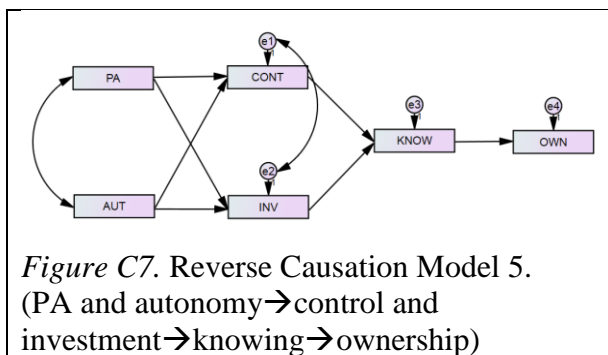
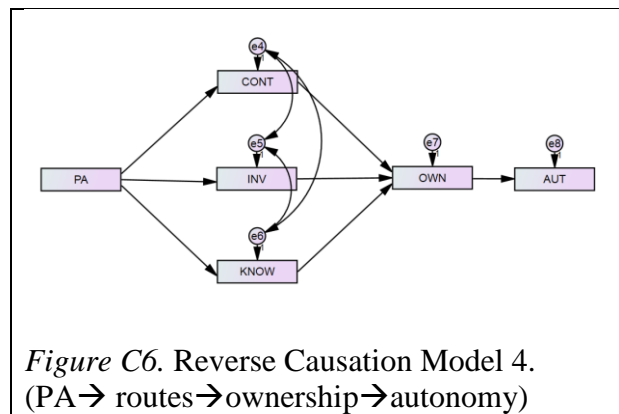
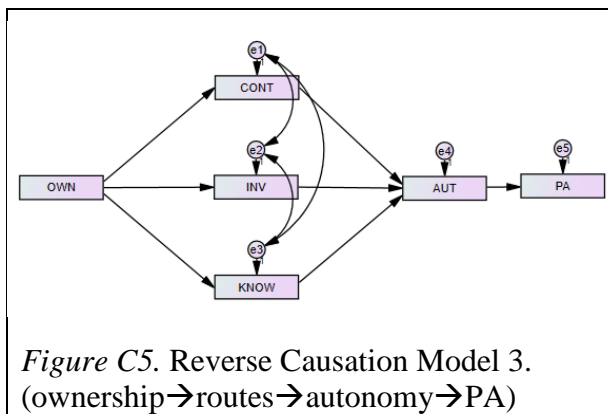
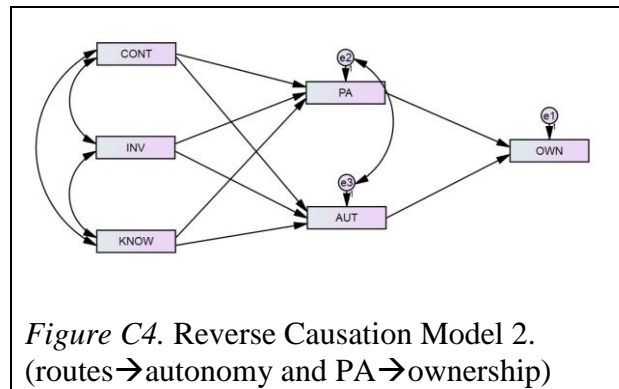
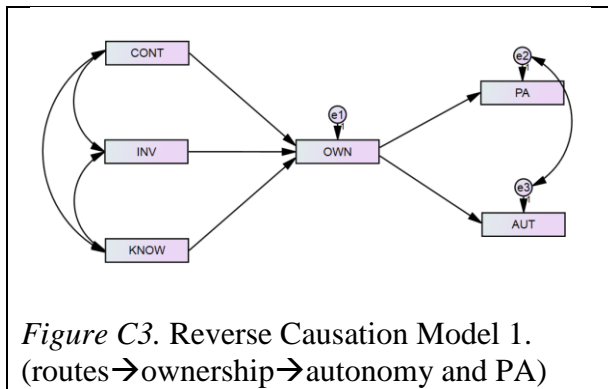
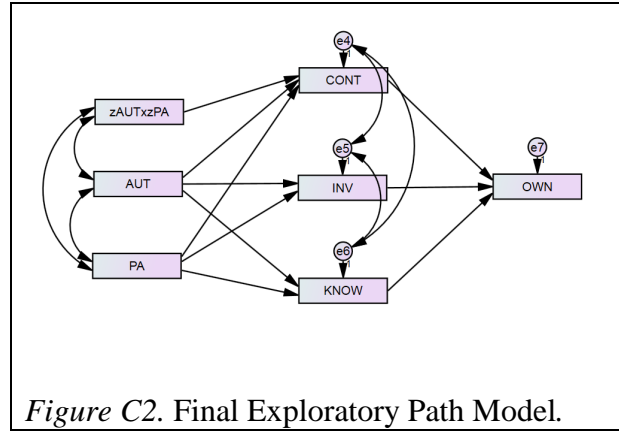
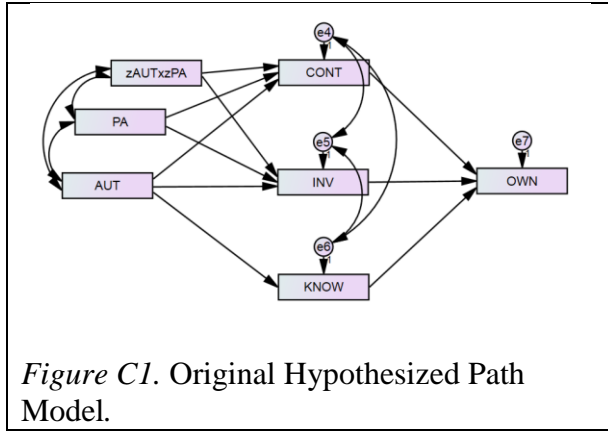
AIC, and *RMSEA*). Also, in the model that tested intimate knowing as an outcome of control and investment, results showed that while the path from investment to knowing was positive and significant ($B = 0.306, p = .000$), the path from experienced control to knowing was not ($B = 0.039, p = .239$). These results rule out several alternative explanations and provide strong support to the hypothesized direction of effects (i.e., flowing from employee PA and job characteristics to ownership through the routes).

Table C1

Comparing Model Fit Between Original, Exploratory, and Reverse Causation Models

Model	χ^2	<i>p</i>	df	CFI	PCFI	AIC	RMSEA (90%CI)
Original Model (Figure C1)	47.303	.000	5	.971	.231	93.303	.141 (.106/.179)
Final Exploratory Model (Figure C2)	<u>5.813</u>	<u>.325</u>	5	<u>.999</u>	.238	<u>51.813</u>	<u>.020 (.000/.072)</u>
Reverse Model 1 (Figure C3)	428.313	.000	6	.710	.284	458.313	.407 (.375/.440)
Reverse Model 2 (Figure C4)	156.982	.000	3	.894	.179	192.982	.348 (.302/.395)
Reverse Model 3 (Figure C5)	82.913	.000	5	.947	.316	114.913	.191 (.156/.229)
Reverse Model 4 (Figure C6)	379.484	.000	5	.743	.248	411.484	.420 (.385/.456)
Reverse Model 5 (Figure C7)	295.314	.000	6	.802	<u>.321</u>	325.314	.337 (.305/.370)

Note. CFI=comparative fit index; PCFI=parsimonious comparative fit index; RMSEA=root mean square of approximation; 90%CI=90% confidence interval around RMSEA. Underlined values indicate strongest fit when compared to the other models in this table.



Appendix D: Relative Weights Analysis

Appendix D

Relative Weights Analysis

Relative weights analysis (RWA; also known as Johnson's relative weights) is a relatively new supplement to traditional regression that attempts to better partition the variance explained by multiple related predictors of a single outcome. In short, RWA works by combining factor analysis (to create a new set of orthogonal/uncorrelated predictors) and regression (to estimate the relationships between the original predictors, orthogonal predictors, and outcome of interest) to estimate the percent of variance that each predictor contributes to the model's overall R^2 (Johnson, 2000). By taking this approach, RWA solves a very common problem in research, whereby correlations among a set of predictors (i.e., multicollinearity) leads to biased and misleading estimates of importance (Tonidandel & LeBreton, 2011).

In the current study, RWA was applied with help of SPSS syntax created by Lorenzo-Seva, Ferrando, and Chico (2010). All variables in the hypothesized model were used in this analysis, including job characteristic autonomy, the three routes to ownership (experienced control, investment of self, and intimate knowing), and trait positive affectivity. Bootstrapping was also used to compute 95% confidence intervals which estimate whether or not each predictor contributed in a statistically significant manner in the prediction of the outcome (job-based psychological ownership).

Results from this analysis are provided in Table D1 below, which shows the contribution of each variable (reported as the percent of contribution). Combined, the five predictors accounted for a majority of the variance in job-based psychological ownership ($R^2 = 51.0\%$; CI95 44.2% to 59.4%) of the variance in job-based psychological ownership. All predictors

contributed in a statistically significant manner, ranging from 39.4% to 9.3%. Of all study variables, investment of self contributed strongest to the prediction of psychological ownership (39.4%, CI95 28.7% to 49.1%), followed by experienced control (23.8%; CI95 16.7% to 31.7%) and job autonomy (17.9%; CI95 11.9% to 25.1%).

Moreover, it is noteworthy that all job characteristics displayed significant positive correlations with ownership that ranged from “small” to “medium” in strength (Cohen, 1988). These include job autonomy ($r = .506, p = .000$) skill variety ($r = .458, p = .000$), task significance ($r = .414, p = .000$), feedback ($r = .372, p = .000$), and task identity ($r = .270, p = .000$). These findings suggest that employees who work in jobs with high levels of those characteristics also reported greater feelings of job-based psychological ownership. Given that psychological ownership displayed significant relationships with all five job characteristics, this also supports the importance of the inclusion of psychological ownership in job design research (e.g., Pierce et al., 2009).

Table D1
Results from a Relative Weights Analysis Showing the Relative Contribution of Each Variable to Predicting Job-Based Psychological Ownership

Predictor	Relative Contribution to Psychological Ownership Multiple R^2	95% Confidence Interval	
		Lower	Upper
Investment of Self	39.4%	28.7%	49.1%
Experienced Control	23.8%	16.7%	31.7%
Job Autonomy	17.9%	11.9%	25.1%
Positive Affectivity	9.6%	4.9%	15.9%
Intimate Knowing	9.3%	5.1%	15.6%
TOTAL (sum)	100%		

Note. ($N = 425$). Multiple $R^2 = .510$. Bootstrapping (10,000) was used to estimate 95% confidence intervals.

Appendix E: Informed Consent

Appendix E

Informed Consent

Informed Consent

I am at least 18 years of age and completing this questionnaire constitutes my informed consent.

Principle Investigators:

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 This research is sponsored by Seattle Pacific University, 3307 3rd Ave W, Seattle, WA 98119

Dear Participant,

We invite you to take part in a research study sponsored by Seattle Pacific University titled **Job Characteristics**. We invited you because you are a working adult. The purpose of this survey is to study a wide range of working adults to improve our understanding of people at work. We hope to recruit 1,000 participants for this study. In order to participate you must be at least 18 years of age.

Participating in this study should take **30 minutes**. The study consists of an online survey hosted at Qualtrics.com. The survey includes a demographics section and five short questionnaires (5-20 questions each). One of these will ask about your feelings and emotions. The other four will ask questions about your current job.

- Participation is **completely voluntary**.
- Your responses will remain **anonymous**, as we do not collect any names.
- This study does not involve risks beyond those encountered in everyday life, and you may skip any question(s) that make you feel uncomfortable.
- You may withdraw from the study at any time.
- There will be no direct benefit to you; however, **you will receive 50 cents** for completing this survey.
- Your data will not be included in this study if:
 - You complete the entire survey in less than three minutes.
 - You are not currently employed at least part-time (>20 hours per week). This is because this survey will ask you to rate your current job.
 - You take this particular survey (launched May, 2015) more than once. We will disqualify surveys taken multiple times using the same IP Address or Mechanical Turk ID.
 - You respond incorrectly to more than one of the three items in this survey that ask you to select a specific response. For example, if the item states, "Please select 'Moderately Agree'" then you must select "Moderately Agree." The purpose of this type of question is to identify unengaged responders.
- If at any time you have any questions about this study or these procedures, please contact the researcher, Dana Kendall at phone 206.281.2152 or by email at kendalld@spu.edu. The SPU professor who is overseeing this dissertation research is Dana Kendall.
- This research study has been reviewed and approved by the SPU Institutional Review Board (IRB # 131402017; valid through 05/19/2015). Questions or concerns about research participants' rights may be directed to the SPU IRB office. The phone number is 206.281.2201.
- To obtain a copy of this consent form, contact Robert Bullock at bobbybe@spu.edu

Thank you very much for your time and effort in completing this questionnaire. Your participation is sincerely valued!

Best Regards,
 Robert Bullock
 bobbybe@spu.edu

CONSENT

A check in the box below indicates that you have understood to your satisfaction the information about participation in this project and agree to participate in this study. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities.

I have read the above information and agree to participate in this study.

- I agree to participate in this study
- I do not agree to participate in this study

Appendix F: Mechanical Turk Recruitment Script

Appendix F

Mechanical Turk Recruitment Script

Welcome!

You are invited to take part in a research study sponsored by Seattle Pacific University IRB # 131402017 (exp. 05/19/2015). We are studying phenomenon that occur in the workplace for the purpose of helping us understand more about characteristics of jobs and the workplace. Therefore, it is essential that we collect data from people who are currently employed and work outside of their home. If you meet the three qualifications below, we would appreciate it if you could take our survey on Qualtrics.com.

QUALIFICATIONS (must meet all three)

1. **You are currently employed full-time (20 hours/week or more), and**
2. **You work in a physical location outside of your home (i.e., you are not self-employed or work only from home), and**
3. **You do not consider Mechanical Turk as your full time job or primary source of income**

If you meet **all three** qualifications please continue reading. If you do not meet those qualifications, or if you meet only one or two qualifications (e.g., you are employed full-time by an organization other than MTurk, but you only work from home) we ask that you do not participate in this survey but appreciate your time and interest and hope that you will participate in future studies.

INFORMATION

- The survey will take less than 30 minutes to complete (<10 minutes on average).
- You will be paid 50 cents for completing the survey. There are no other benefits from participating in this research.
- You may only take this survey once.
- All responses will remain completely anonymous.
- Again, due to the nature of this research, participants may be disqualified from this study if they are not currently employed, if they consider MTurk as their full-time job, or if they only work from home.

INSTRUCTIONS

Participate by following the link below to our survey. Clicking the link will open the survey in a new window. While taking the survey, please read all instructions carefully and honest as accurately and honestly as possible. On the last page of the survey, you will be asked to enter your MTurk ID and will be provided with a randomly generated Mechanical Turk Code. Copy the code and paste it in the space provided at the bottom of this page, then submit.

SURVEY LINK (will open in a new window)

https://spupsynd.az1.qualtrics.com/SE/?SID=SV_5gVZbY3RSLDFpiZ

If at any time you have questions about the study or the procedures, you may contact the investigators, Robert Bullock, at bobbybe@spu.edu or 425.864.1934, or Dr. Dana Kendall, at kendalld@spu.edu or 206.281.2152. If you have questions about your rights as a participant, contact the Chair of the SPU Institutional Review Board at irb@spu.edu or (206) 281-2201. [IRB#: 131402017]
Expiration Date: [05/19/2015]

Thanks for your time and consideration!

Sincerely,
Robert Bullock

Provide the survey code here (code is provided on the final page of the survey):